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SOME METHODS OF SECURING CLOSER UTILIZATION

By R. C. Bryant, *Professor of Lumbering at Yale College*

[This is the second of the series of special articles on various phases of lumbering by Professor Bryant. It deals with a subject of vital importance to all lumbermen, and about which a number have been asking the American Forestry Association for information. Prof. Bryant treats in detail the best methods of eliminating waste and his advice will be found practical and of great value.—Editor.]

CLOSER utilization of the raw products of the forest is becoming more evident each year, although in all sections there are operators who still ignore the profits which may be made from material they now waste.

As in the meat industry in the early days, the only product saved was the beef and hide, so in the lumber business today the majority of the loggers and manufacturers take only the standard length lumber and to a large extent fail to utilize the various by-products such as "shorts," sawdust, slabs, etc.

Although there has been much unjust criticism of lumbermen because of the methods they have employed in harvesting their timber, it is true that large quantities of raw material have either been left in the forest to rot, to furnish fuel for forest fires, or have been burned in the incinerator at the mill. However, in nearly every case where this has been true, the chief reason could be found in the low prices obtained for the manufactured material. For years knotty, defective and small trees could not be made into lumber and sold at a profit. Lumbermen, as a rule, are as keenly alive to their interests as men engaged in any other industry and it is folly to assume that they would wilfully neglect an opportunity to manufacture lumber that could be marketed at a profit, especially since much of the material that was left behind in the forest or was burned at the mill had to be handled in some way before it was abandoned. During the early years good material was used for the construction of roads, skidways, camps and like purposes when inferior timber was available, but the logger preferred the choice timber, since it was both cheap and could be worked to better advantage.

A recent writer has charged present-day lumbermen with gross waste, claiming that more than 50 per cent of the raw product is wasted during the progress of logging and manufacture. Such statements are misleading to those not fully acquainted with conditions. The author of the article undoubtedly misinterpreted the figures he quoted, which appear to have been taken from a publication of the Forest Service. These figures are not based on the merchantable content of the tree, but upon the total content, including bark, stump and limbs, all of which, with certain exceptions, are not merchantable. In addition the amount of necessary waste is increased by the loss of wood due to sawdust, slabs or defects which render the affected portions of the bole of little or no value.

LOSS IN FOREST AND AT PLANT.

The actual loss of the raw product occurs both in the forest and at the manufacturing plant. In the forest it has been estimated to be as high as 25 per cent, although it is constantly being reduced by improved methods of

operation and higher market values for the low-grade product.

The chief wastes in the forest have been, and are, due to the cutting of high stumps; the careless cutting of the bole into logs, both as regards length, crook and defects; leaving merchantable timber in tops, logs and standing trees; breakage in felling; and loss in transport, especially in log driving.

Stumps are now being cut at a reasonable height on most operations. There is still insufficient attention paid to securing both quantity and quality from the felled timber. The serious losses which often occur in cutting crooked logs, in breaking timber in felling, and in leaving an excessive amount of timber in the tops could be largely remedied by proper supervision. However, timber may be perfectly sound and yet be so knotty that it cannot be brought out at a profit, due to market conditions. As a rule, however, it is possible to secure more merchantable timber from the tops than is usually taken.

SAW MILLS ON FLAT CARS.

The author firmly believes the time will come in the near future, in those sections of the country where logs are brought from the forest to the mill by rail, when it will be possible to install small portable saw mill plants on flat cars which can be taken to the forest and there used for sawing very crooked logs and knotty tops into material suitable for novelty and similar work. The coarse material, very crooked logs and broken boles can be cut into short lengths, four feet or more long, and corded up along the railroad track after the regular logging crew has removed the saw timber destined for the large mill. The small mill can then be taken to the site where the timber is stacked, the logs elevated by power onto the car, and sawed into lumber. This material would furnish large quantities of narrow widths and short lengths of choice stock, provided the large knots were removed.

One reason why operators have failed to handle knotty logs in the main saw mill has been the low sale value of the product, coupled with the high cost of manufacture incident to their utilization. The knots on rough logs are tough and dull the saw teeth quickly, so that the timber must be fed against the saw at a slower speed than logs without knots—this means increased cost of manufacture—and further when clear logs are placed on the carriage the saw is not in condition to manufacture good lumber. This effect could be obviated by providing special equipment for sawing defective, crooked and knotty logs. In this way the main saws will make a greater cut and produce lumber of better grade and the product from the poorer logs can be handled by less skilled labor without, in any way, reducing the output of the mill.

REASONS FOR UTILIZATION.

There are several reasons why it is advisable to utilize this rough material. When left in the forest it not only makes an effective fire trap, which is a menace to the remainder of the property, but it also provides a breeding place for insects and fungi. The increased amount of timber secured per acre and the greater tonnage hauled per mile on the logging railroad helps to cut down the logging expense per thousand board feet. It also postpones the time when the tract will be cut over. Since utilization is becoming more intensive each year and lumber of higher value, it is self evident that it is advisable to postpone the closing of the plant to the latest date possible.

A further use for the rough material usually left in the forest is in the manufacture of certain oils which are secured by destructive distillation. In some of the Norway pine forests of the North and the longleaf forests of the South, it has been found profitable to distill stumps and in some cases the larger wood in the tops. The expense of bringing the raw material to the distillation plant has not yet given this scheme wide application.

WASTE AT THE PLANT.

The raw material wasted around the manufacturing plant consists of sawdust, exclusive of that part utilized for

A CONDITION SHOWING WASTEFUL LUMBERING.

fuel; edgings; slabs; and short length lumber, including trimmings from the saw mill and the planing mill.

Around most large saw mill plants the greater part of the sawdust is required for fuel in the power house, hence the loss is not great. However, in plants where circular saws are used instead of band saws, the per cent of the log that is converted into sawdust is greater than is necessary and the operator suffers a loss from this cause. In large mills there are few cases where an operator is warranted in continuing the use of circular saws, for by so doing he is not only wasting material, but likewise is reducing the output he should secure from a given number of logs. Near large centers of population, saw mills are often able to sell surplus sawdust to ice companies for packing ice, and to certain classes of merchants to cover the floors of their places of business. It is reported that it has been pressed, successfully, into sticks and used for fuel, retailing for $9 per ton. Aside from the above uses it is distilled in retorts and various products, chiefly alcohol, extracted; in a fine form it is used in the manufacture of dynamite and also linoleum. The uses for sawdust are increasing and in the near future plants favorably located will undoubtedly have no surplus product of this character to destroy in a burner.

The waste in slabs is due to several causes, among which are crooked logs and those with a large well on one end; also heavy slabbing on the part of the sawyer. It is seldom desirable to bring a very crooked log into a mill since the loss in slabbing is usually heavy and the output for the mill crew is reduced because of the difficulty of handling crooked logs on the mill deck and the loss of timber in squaring up the stick. Where special attention is not given to sawing, sawyers frequently slab heavily in order to secure a merchantable board the full length of the log when the second cut is made. If all logs were perfect cylinders this loss would not be great. Since most logs are larger at one end than at the other—and often the difference is quite marked—the slabs on the large end of the log will usually contain material that would produce several short boards of merchantable width and length. This waste can be greatly reduced by having the pond men send all sound logs to the deck, large end first. If the management then insists on the sawyers cutting thin slabs, the maximum amount of lumber can be secured. This is especially true where long timbers are cut. A test made in a Southern pine "timber" mill showed an increase of 5 per cent in the output when this system was used. Placing the butt end of the log on the forward part of the carriage is also an aid to the sawyer, since he can see shake, rot and other defects which are of more frequent occurence on the butt end than on the top end of the log. There are certain mechanical advantages possessed by this method which tend to increase the cut of the mill. Where the small end of the log is placed near the sawyer, the carriage must make a run the full length of the log in order to remove the slab, while where the large end is placed nearest the sawyer a short carriage run only is needed until the log is slabbed down so that the saw cuts for the entire length of the log. While this saving of time is not so apparent in a slow speed mill it adds materially to the day's cut where the mill is run at high speed. It is seldom desirable to place the small end of the log on the forward part of the carriage unless that end, only, is defective.

LOSS IN EDGING.

The waste in edging lumber varies greatly in different mills, since it depends largely on the watchfulness and interest displayed by the manager, and on the skill of the edgeman himself. Two forms of waste are frequent in edging. One is due chiefly to carelessness on the part of the workman who fails to set his saws properly to secure the maximum width possible and who in consequence may waste clear material on one or both sides of the board. A second form of waste is due to the trade requirements which demands even-inch widths in boards. Custom has decreed

SHOWING A CONDITION OF WASTEFUL LUMBERING FOLLOWED BY FIRE.

that lumber shall be cut in even widths and this often entails a sacrifice of an inch of lumber on a given board. In time this waste is certain to be eliminated, and also the requirement that all lumber shall be cut in even lengths. A third and also a common form of waste is seen in many mills, especially in the yellow pine region of the South, where large quantities of quarter-sawed flooring are manufactured. Unless flooring is a specialty with the mill and it often is not, the stock for manufacturing this kind or product, made in 3- and 4-inch widths, is secured by ripping, on the edger, quarter-sawed strips from wide boards. These boards often have clear stock on one or both edges, and are knotty in the center or possibly on one edge. Since quarter-sawed flooring is worth several dollars more per thousand board feet than No. 1 common boards from which they are usually ripped, it is very desirable that all of them shall be saved. Unless the edgerman is well posted on grades and values he will often leave flooring strips on wide boards and the operator suffers a distinct monetary loss. Since No. 1 common stock is usually air-dried and often becomes sap stained, strips can not later be secured to advantage, because of their reduced value, due to this defect. This loss in edging can be eliminated largely by employing edgermen who are expert graders and who are well posted on values. A distinct advantage would be gained by having a man at this work with whom the manager could talk over, intelligently, the question of values.

DISTILLATION PLANTS.

Where the daily output of lumber is large, some operators have found it practicable to encourage the establishment of destructive distillation plants and paper mills, chiefly for the utilization of slabs and other mill refuse. This practice will increase in favor with large operators, during the next few years, when the methods have proven to be beyond the experimental stage.

A common form of waste is in short lumber. It is only a few years ago that the writer saw, at a Texas mill, all lumber eight feet or less in length sent to the burner. Even now many southern mills do not save any lumber less than six feet in length. Many of the short length pieces come from side boards which are the result of squaring up the log, and hence are to a very large extent free from knots and will make lumber of the higher and highest grades. Material of this character is especially suitable for novelty work and indoor finish, such as wainscoting, etc. It can be worked into an endless number of patterns cut to the length required by the consumer. There is no reason, except possibly the slight additional labor charge for handling and re-manufacture, why such material should not be used by the carpenter or novelty manufacturer rather than purchasing long lengths and cutting them into shorter ones. This fact is now evident to many buyers and keen lumber salesmen find a market for more short lumber than their mill normally produces and the price is not far below that secured for standard lengths.

DEMAND FOR "SHORTS."

A further source of "shorts" is from pieces secured while slabbing logs, and also from the ends of boards cut off at the trimmer and in the planing mill. These two sources yield short pieces which are in demand by novelty works. The sizes in which this material is marketed are extremely variable, owing to the multitude of purposes for which it is used. The following are some of the smaller sizes sold by one firm.

1″ x 1⅜″ x 6″
1″ x 1″ x 25″
1″ x 3″ x 22″
1″ x 4″ x 21″
1″ x 6″ x 12″
1″ x 6″ x 13″

All of these and a multitude of other widths and lengths can be made from material picked from the conveyor carrying refuse to the burner. While the sale value of "shorts" is not great the mill owner who sells them secures a satisfactory profit from material he otherwise would be forced to burn at a cost to himself.

The manufacture of shorts is still in an experimental stage, although the demand is good and is constantly increasing. Those millmen who now handle them often prepare them with machinery which has been cast off in some other department and which is not always as well adapted to the work as it might be. Further cheap labor is often employed in the "shorts" department and because of its inefficiency the best results are not always obtained. It is believed that the introduction of special machinery for handling shorts and the employment of more skilled labor would enhance the value of the product and also increase the amount of material secured. An undesirable feature of "shorts" manufacture is that the supply of raw material for lath is greatly reduced and a sufficient supply of them can not always be secured. The manufacturer, therefore, must choose between the two products.

There are several reasons why the manufacture of short material should appeal to the up-to-date manufacturer, among which are: (1) a small profit is made from material that otherwise must be burned at an actual monetary outlay; (2) an expenditure for power is seldom required since the main power plant can usually meet the light extra demand made on it. There is also a gain in efficiency since the same labor, supply and repair cost for power is distributed over a greater output; (3) the increase in the payroll usually means an increase in business at the company store.

Short length lumber from four to six feet long has been handled most successfully by those who have marketed it as a special product rather than by trying to sell it in combination with standard lengths. Shorter lengths are always sold under special contract.

WASTE IN ODD LENGTHS.

A form of waste that has attracted much attention during the last few years is that of odd lengths. It has been the custom, for years, and still remains so, for manufacturers to place their product on the market in standard lengths, ranging from ten to twenty-four feet, in multiples of two feet. This practice grew up largely among the white pine trade and, apparently, was inaugurated to simplify lumber measurement. It has several advantages from the retailer's point of view, in that fewer lengths of lumber must be carried in stock to meet consumers' demands; hence a smaller stock and less shed room is demanded. It is well known, however, that it is very seldom that builders can use lumber in even lengths, it being necessary to cut some even length back to the odd length desired. It is perfectly feasible, therefore, to use odd lengths, and it would mean a large saving of valuable material at the manufacturing plant. It has not been possible, however, for the manufacturers to convince the buyers that odd lengths can be used to advantage and this waste still goes on as it has for years past. An estimate of the Forest Service places the loss of material due to the necessity of cutting Southern yellow pine to even lengths at 1.21 per cent of the total cut, a large waste in the aggregate, when we consider that the lumber cut in 1911 was nearly 13,000,000,000 board feet. The waste in odd lengths occurs chiefly at the trimmer in the saw mill, where defects on the ends of boards could often be removed by cutting off one foot only, and in the planing mill where a similar difficulty is encountered.

ENORMOUS CYPRESS TREE.

A report from Helena, Ark., states that there has been found in the bottom lands of the Mississippi what is believed to be the second largest cypress tree in the world. The forest giant is reputed to be over two thousand years old, and is enormous in its proportions. The tree was located on the tract of land belonging to the Fee-Crayton Lumber Company, which plant has a large mill in Dermott. Investigation of the find developed the fact that the tree was thirteen feet in diameter.

GRAZING ADMINISTRATION OF THE NATIONAL FORESTS IN ARIZONA*

By R. R. Hill.

THE stock industry in Arizona ranks third among the industries of the State with an annual output valued at $6,000,000. Undoubtedly its relative importance to the prosperity of the State will not diminish because of the ever increasing demand for its products, and because a large part of the range upon which the business is dependent is unsuitable for agriculture. It is estimated that 50,000,000 acres, or about 70 per cent of the entire area of the State will remain, for many years to come, valuable chiefly for grazing. Of this area which is unsuitable for agricultural purposes 14,898,000 acres, or 30 per cent of the total, lies within the national forests. In 1912, according to the crop report, these range lands supported approximately 104,000 head of horses, 774,000 head of cattle, and 1,565,000 head of sheep. Of this number 8,218, of 8 per cent of the horses, 214,334, or 32 per cent of the cattle, and 415,074, or 26 per cent of the sheep were grazed during at least a part of the year upon the national forests. The importance of the stock industry and its dependence upon the national forests make it worth while to consider the grazing administration of the forests; the conditions at the time the ranges were placed under control; the general policy adopted; the bearing which the regulations provided have upon the stock business and other interests; the problems involved; and the probable future of range control.

The dependence of the stock industry upon the national forests is not due to arbitrary causes but is a result of natural conditions. The great range in altitude, from about sea level in the extreme southwestern part of the State to elevations of between 6,000 and 12,000 feet over a plateau which extends southeast through the northern and central portions, is reflected in a wide variation in climatic conditions and in

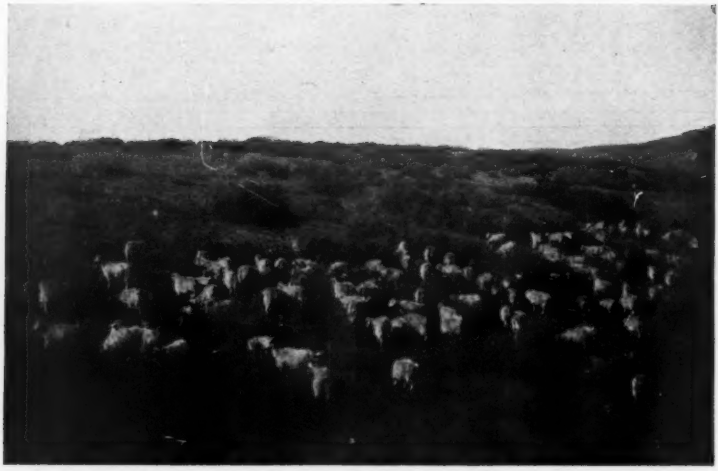
BUNCH GRASS AND OAK BROWSE IN THE WESTERN YELLOW PINE TYPE MAKE AN EXCELLENT LONG SEASON RANGE.

GRAMA AND BUNCH GRASS RANGE AT THE EDGE OF A PARK IN THE WESTERN YELLOW PINE TYPE. ONE OF THE MOST IMPORTANT FORAGE TYPES ON THE ARIZONA NATIONAL FORESTS.

the character and composition of vegetation. With these varying through related conditions as a basis, the range of Arizona may be divided into three main classes, the winter range, the summer range, and the all-year range. The following table indicates the correlation of temperature, rainfall, and character of vegetation, with elevation, for three fairly representative localities within these main forage classes.

Early in the history of the stock business a system for handling stock developed whereby each of the three main range types were used at some time during the year. This system has remained in its essential features throughout the development of the industry. The mild winters of the lower valleys and mesas, together with the usually abundant short-lived winter annuals occurring there, make of these areas excellent ranges during the time when the high plateaus are snow-bound. As many stock winter among the foothills, in the all-year range, as the forage and water supplies will accommodate. When the spring droughts dry up the forage and water supplies on the low mesas, the stock on these mesas drift up toward the foothills, where the climate is cooler and where the serious effects of the drought are not felt so early. The consequent crowding of this type during the early spring usually removes all surplus vegetation by the time growth starts on the higher plateaus. By the middle of May the congestion on the lower range is relieved by a large portion of the stock drifting or being driven onto the high forested areas, where they remain until the fall storms force them back to the winter range.

Until the national forests were created, grazing over the entire public domain was under no restrictions except those imposed by the stockmen themselves. As a result of the lack of a central authority, trouble between sheep-men and cow-men was frequent. The general practice was to sacrifice the future carrying capacity of the range for immediate returns; the range in many places was overlooked; and dry years often found the stand of forage depleted and very little water stored up to tide stock over. Small owners had no recourse when crowded out of business by large owners. Very few stockmen even considered the need of protecting young tree growth against injury by grazing. Although many recognized and deplored these natural



A MIXTURE OF BROWSE, WEEDS AND GRASS, FOUND COMMONLY AMONG THE FOOTHILLS, MAKES EXCELLENT GOAT FORAGE.

results of unrestricted grazing, they felt that Government control would not better conditions; that regulation meant interference with their established rights; and that it would demoralize the stock business. The silviculturist, on the other hand, recognized that the prime purpose in withdrawing these large areas of forested lands was to conserve the timber supply. He considered that the forest cover should be maintained and that, if stock were interfering with the growth of young trees, grazing should be restricted and if necessary prohibited.

It became the duty of the forest officers to reconcile the demands of these apparently conflicting interests. The fairest plan proved to be such a coordination of all interests depending upon the forest resources as would result in the fullest use of these resources without jeapordizing their future yield. The policy adopted encouraged the grazing of stock so long as it did not impair the forage cover and did not seriously interfere with the growth of young timber. To accomplish these ends the following general regulations have been provided:

1. Permits are required for all stock using the range. This tends to prevent irresponsible grazing and is the first essential in any sort of range control.

2. Estimates are made each year of the carrying capacity of each forest divided into grazing districts and permits are based upon these estimates. In cases where it is necessary to reduce the number of stock in a given district the reductions are made gradually, and, wherever possible, the surplus stock are shifted to undergrazed areas.

3. Each permit specifies the area of the permittee's allotment. Where stock movements are under control, which is generally the case with sheep, and with cattle and horses where drift fences, pastures, and natural barriers form range boundaries, permittees are required to keep their stock within specified limits. Responsibility for the handling of any allotment is in this way fixed and the best distribution of stock according to the amount of feed and the general condition of the range is secured.

4. Permits specify the opening and closing dates of the season for which they are issued. These dates are so adjusted as to prevent too close grazing before forage growth has made a

good start and to prevent the holding of stock on the forests after the herbaceous forage is consumed, for then stock might be forced to eat forest reproduction.

5. The development of water sufficient for the number of stock requested is necessary before a permit is issued to use an allotment. This provision is one of the greatest aids in preventing overstocking near old water holes, in opening up otherwise inaccessible range, and in fortifying the stock industry against long droughts.

6. The bona-fide settler is given the privilege of running a certain number of stock. Provision is made for his stock by reducing, if necessary, the number of stock run by the other permittees using the range.

7. A maximum limit restricting the number of stock which any one man or corporation is allowed to run on a forest is established in order to prevent possible monopoly.

8. Speculation is minimized by requiring permittees to own improved ranch property and to be the bona-fide owners of the stock which they desire to run on a forest.

9. Forest officers co-operate with stock associations in determining matters affecting the handling of stock, apportioning the range, and, as far as is practicable, the suggestions of permittees submitted through their advisory boards are considered by forest officers in working out administrative problems.

10. By Act of June 11, 1906, Congress provided that all Government land within the forests that was better suited for agriculture than for growing timber should be subject to homestead entry. The liberal application of the provisions of this Act has resulted in many settlers taking up homes within the national forests. Since these settlers are assured grazing privileges the result has been that the forests are dotted with ranches whose owners are enabled to make a comfortable living by combining farming with stock raising on a small scale. In this way the man of small means is helped in getting a start and the development of these natural resources is encouraged to an extent impossible without Government regulation.

The effect of the enforcement of these regulations upon the carrying capacity of the range is indicated by the fact that in 1907 the average area required to support a cow upon the national forests of Arizona was ap-

SHEEP FEEDING ON A SAGE BRUSH AND GRAMA GRASS TYPE NEAR THE LOWER LIMITS OF A NATIONAL FOREST.

MANY PARKS WITHIN NATIONAL FORESTS HAVE BEEN TAKEN UP BY HOMESTEADERS, WHO COMBINE FARMING WITH STOCK RAISING.

proximately 48 acres, while in 1912 only 40 acres were required.

The question of the amount of damage done to young forest growth is still unsettled. Special studies are being conducted to determine the various effects of grazing upon forest reproduction, but until these studies are completed no definite conclusions can be drawn. Extensive observations, however, indicate that carefully regulated grazing does not seriously interfere with new forest growth. Probably the damage done by eating tender shoots of seedlings is partly offset by the beneficial effects of keeping the grass cover eaten off, thereby giving the seedlings a more favorable chance to compete with other vegetation. In addition, the trampling, especially that of sheep, has it advantages since it aids germination of tree seed by helping to cover the seeds, mulch the surface, and stir the sod.

One important effect of grazing the forage crop each year has been the great reduction in loss from severe ground fires. Prior to extensive grazing, unrestricted fires did more, perhaps, than any other factor to kill young forest growth.

The development of permanent water and the assurance of continued use of allotments have helped to put the stock industry on a more stable basis. The stock-men know what range and what water resources they can rely upon from year to year and consequently are encouraged to handle their stock so that there will always be a reserve supply of feed and water. In a region where frequent droughts are apt to play havoc with a range having no reserve supply of forage or water these factors are of great importance in determining the stability of the industry. In turn, the increased stability of the industry has resulted in a marked improvement in the quality of range stock during recent years. Generally, only bulls, stallions, or bucks of a standard breed are now placed on the range. This improvement in the quality of stock together with the improved forage and water conditions enables stock-men to sell a larger per cent of sheep and cattle directly from the range for mutton and beef.

One of the most important results of the grazing administration has been the changed attitude of stockmen toward the Forest Service. While the large majority were originally skeptical of any good resulting from range supervision, if not openly hostile toward the innovation of range control, at present

the belief is general that the Forest Service has, in the main, justified its establishment. Stockmen are now as anxious to secure Forest Service protection as they formerly were to avoid coming within its jurisdiction. Although they may perceive imperfections in the Service, they believe that conditions have improved under government control and they now protest against excluding their range from the forest, preferring regulated grazing to the lack of control. Undoubtedly the gradual crystallizing of opinion among stockmen in favor of leasing all of the unappropriated public domain is, in a measure, due to the satisfactory results obtained under Federal regulation of the grazing resources of the National Forests.

The Forest Service has been so occupied with matters of organization and administration that until recently little attention has been given to problems of constructive improvement. In order to handle such problems it has long been felt that detailed information regarding grazing resources and conditions was necessary. This information is now being collected by grazing reconnaissance parties on two of the National Forests in Arizona; it is planned to extend the work to include all of the forests. The data collected include a map of each section showing timber and forage types, topography, and a detailed description of soil, forage species, distribution and abundance of poisonous and worthless plants, range destroying animals, utilization of forage, water facilities, and suggested improvements. With this detailed information to supplement the more general and practical information of the administrative officers, it is believed that most of the important range problems may be successfully handled.

Among these problems should be mentioned:

(1) How to secure the best utilization of the range. With detailed information of forage types, including distribution, abundance, and forage value of species and with accurate knowledge of water development, and seasons for which the types are best adapted, the proper distribution of stock becomes largely an administrative problem. Sheep movements can be readily controlled by confining them to certain prescribed allotments. Cattle will have to be controlled by drift fences, natural range boundaries, development of water, salting grounds, and by driving them onto their proper allottments.

(2) How to improve depleted ranges. With these areas accurately located and

DRIVING CATTLE TO THEIR RANGE ON A NATIONAL FOREST.

A LARGE STOCK TANK IN THE WOODLAND TYPE ON A NATIONAL FOREST.

described, the most practical remedy is to manage the grazing so that the forage species will have an opportunity to seed. This can be accomplished by shortening the grazing season, by rotating the movement of sheep so that they will not graze on the areas to be protected until the seed has matured. If a certain class of stock is responsible for overgrazing, this class of stock should be shifted to other allotments. Reseeding artificially should be tried and promising exogenous species introduced.

(3) How to prevent serious damage to young forest growth. As soon as the special studies determine the extent of damage, the class of stock mainly responsible, and the conditions under which severe injury is done, steps

WHEREVER SPRINGS OR OTHER NATURAL WATER SUPPLIES ARE AVAILABLE, STOCKMEN HAVE PERMANENT CAMPS.

should be taken to remove the causes of serious injury. It is probable that the measures proposed to secure the best distribution of stock over a range will serve largely to do away with the serious damage to forest reproduction.

(4) How to minimize the danger from poisonous plants. This is a problem which deserves emphatic treatment. The spread of poisonous locos, milkweeds, the pingue, and several other obnoxious weeds over some of the ranges well supplied with forage and water has greatly reduced the practical value of these ranges and threatens to become a very serious menace to grazing not only upon the forest but upon all the higher ranges in the state. The eradication of these objectionable plants is properly a problem for the Bureau of Plant Industry, but the Forest Service with detailed information as to location, abundance, and habits of these plants on the various forests will be in a position to co-operate in any plan to exterminate them. Stockmen will be advised as to the areas infected, the periods when the different plants are apt to injure stock, the seasons when the stock may safely graze infected areas, and any preventives and methods of handling stock whereby the danger from poison may be minimized.

Judging from the state of public opinion, which has changed from one of unfriendliness to one of approval and co-operation toward the grazing administration of the forests in Arizona, it is reasonable to suppose that these ranges will continue under government regulation. In fact, it is entirely probable that the essential features of this control will be extended to all public ranges within the State.

The more intensive plans leading to the best utilization and fairest distribution of all range resources, the improvement of ranges so that they may reach their maximum carrying capacity, and the protection of forest reproduction will become prominent features of the grazing administration policy.

*By courtesy of the University of Nebraska, Forest Club Annual.

STUDENTS DO LOGGING WORK

DR. C. A. SCHENCK, Director of the Biltmore Forest School, announces an innovation in the school's forestry course by which the students are sent to work to a logging or milling operation on the approach of winter. He says:

"Students admitted to the Biltmore Forest School in the coming fall or in the winter, 1913-14, will be placed in the woods, to work a prenticeship in logging and milling, under the auspices of a graduate of the Biltmore Forest School. They will be required to work for common wages and will be dismissed mercilessly unless they perform the work expected from them with the utmost diligence and energy. Every week, a written report is submitted by the prentice to the director of the Biltmore Forest School, together with a certificate signed by the foreman testifying to the prentice's efficiency.

"Such prentices as have stood the test successfully will be assembled by the Director in March, 1914, and will be taken to the School's western camp in Oregon, there to join the junior and senior students of the school who have spent the winter in the Western lumbering operations.

"The spring, summer and fall of 1914 will be spent by the entire school in British Columbia, Washington, Oregon and California.

"By October 1st, 1914, the students will be allotted to various Western lumber camps, there to spend the winter 1914-15 under the auspices of the Alumni of the Biltmore Forest School, subject to the rules and regulations given under 1.

"The students join the teachers in March, 1915, in the Adirondacks, to spend the spring, summer and fall in the Eastern camps of the Biltmore Forest School, receiving, on October 1st, 1915, the degree of Bachelor of Forestry, provided that they have stood the tests prescribed."

FORESTRY AT THE NATIONAL CONSERVATION CONGRESS

SEVERAL hundred foresters and lumbermen from all parts of the United States, together with many from Canada, are to attend the National Conservation Congress in Washington, D. C., on November 18, 19 and 20. It has been decided that at least two full sessions of the Congress will be devoted to forestry matters. Special committees have been at work since the last Congress, under direction of the Forestry Committee, investigating subjects of the greatest importance to foresters and lumbermen, and these committees are to make their reports at the meeting.

During the entire session of the Congress there will be a sectional meeting of foresters and lumbermen at the New Willard, and this will be open all the time that forestry addresses and discussions are not going on in the main meeting.

It is planned now to devote considerable time, in the sectional meeting, to reports of the sub-committees which have been conducting the investigations, and to discussions on these reports, and as the committees are composed of recognized experts on the subjects under investigation, the discussions and the reports will furnish the most valuable facts, ideas and findings on these subjects that it has ever been the privilege of any such gathering to hear.

Aided by the fund of $5,000 which the American Forestry Association secured to pay the expenses of the work they are doing, the committees have been enabled to go into details in securing information which it would have been impossible for them to do without such a fund. Accordingly, it is expected that the reports will be unusually comprehensive and conclusive. As it will be impossible to present all the reports in detail to the main body of the Congress, the Forestry Committee will agree upon a general report on each subject, and the plan now is to present these general reports for the consideration of the Congress, distributing them through the several sessions.

During the time the foresters and lumbermen are in Washington they are to have a banquet, the details of which will be arranged by committees of the American Forestry Association and the Forestry Committee of the Congress. At this banquet some of the leading foresters and lumbermen of the country are to make addresses.

Mr. Charles Lathrop Pack, president of the Congress, although he has been handicapped by illness during the summer, has managed to complete most of the arrangements for the big gathering and within a short time will be enabled to announce the full program. Chief Forester Henry S. Graves, who is chairman of the Forestry Committee of the Congress, had a conference with Mr. Pack in New Hampshire on August 25th, and Mr. Pack approved the tentative forestry program of the Congress which will be formally announced as soon as the program committee has passed upon it. This includes addresses on all of the important phases of forest conservation, and existing forest conditions, by men of national prominence west and east.

Mr. Graves said, upon his return from the conference, that under the head of forestry will arise the question of extension of the Government's control of grazing on the National Forest ranges. He said:

"Our unreserved public ranges have been so seriously over-grazed that it is no exaggeration to say that they have been already reduced in productiveness more than 50 per cent from normal. A drouth like that now prevailing in the Southwest shows the effect of the grazing abuse with startling emphasis. I do not see how this condition can help affecting the cost of meat to the consumer. The situation will continue to grow worse every year until the public takes steps to regulate the open ranges and prevent their rapid deterioration.

I brought this question before the Conference in New Hampshire, and the sentiment was unanimously in favor of providing for Government supervision so as to guard against such danger. It was decided that this subject should have a place on the program of the Conservation Congress."

Municipal Forestry was also discussed. In Germany cities and towns own vast areas of forest lands, which are managed along lines of scientific forestry. There is a growing sentiment for the creation of such a system in this country.

THE INVESTIGATIVE WORK

The special committees have now spent several months in their labors and are at present preparing reports.

It is no small task to get up the reports which are to be considered. That is already realized by the members of the forestry committee, by E. A. Sterling, the secretary of that committee, and by the chairmen of the subcommittees. Members of the committees are doing their best to reach every source of information on the subject which they are investigating, and there is such a bulk of replies that getting from them the material which is of value, involves a large amount of work.

At times, too, members of subcommittees are so busily engaged with their own duties that it is impossible for them to spare the time for the labors of the committee. However, each committee chairman is expected to make a report on schedule time to the Forestry Committee and already excellent progress is being made toward that end by a number of the sub-committee chairmen.

On or before September 10 these chairmen are to send their preliminary reports, based on all data on hand, to the members of their committees, to others who might make helpful suggestions, and to Secretary Sterling, of the Forestry Committee. They will give notice that the reports are to be returned to them, with all comments and additional material, before September 25, and they will not wait for replies from subcommittee members and other correspondents who are delinquent.

Not later than October 10 the subchairmen will send their revised and completed reports, representing the approval and revisions of the subcommitteemen, direct to each member of the Forestry Committee.

By October 20 each subcommittee chairman will receive from the Forestry Committee the revised and approved

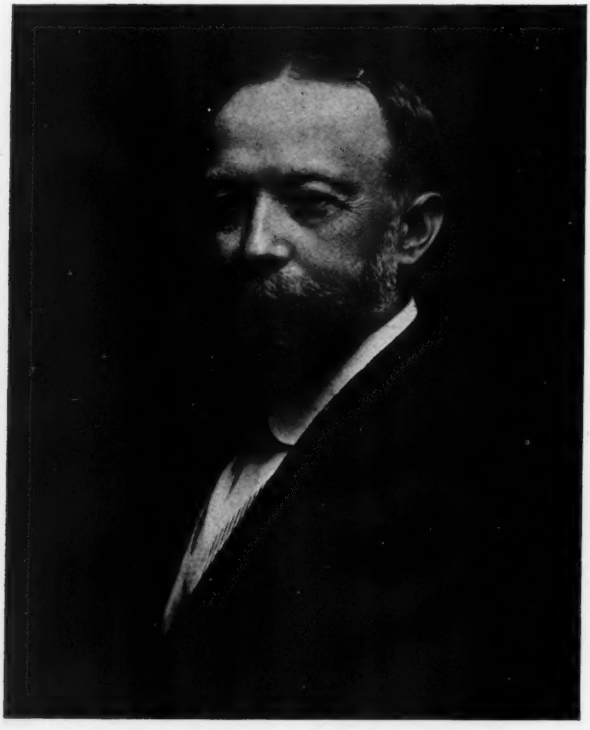
CHIEF FORESTER HENRY S. GRAVES,
Chairman of the Forestry Committee.

form of their reports, with notification of form and alterations to be observed in a synopsis.

Not later than November 1 the subcommittee chairmen will mail to Secretary Sterling, of the Forestry Committee, a synopsis, based on the approved form of their report, and calling attention to the most important points, the conclusions reached, the questions needing discussion, and the topics requiring further study next year.

FOREST FIRES COMMITTEE.

As an indication of how thoroughly the various committees are conducting



MR. CHARLES LATHROP PACK, PRESIDENT OF THE NATIONAL CONSERVATION CONGRESS.

their investigations the form issued by the subcommittee on forest fires is valuable. This committee is getting information from all sources from which it may be had, and the series of questions asked cover the field completely. The form, under the various sub-divisions, asks the following questions:

A.—Present Attitude.

1. Has any organized fire protective work been done in your State?

2. If not, along what lines should work be done? What is your greatest need; laws to control the individual or to regulate the railroads; an organization to enforce laws, or an appropriation to make them effective?

3. Are there any private owners who themselves protect their timber from fire? How many? What is approximately the total area patrolled by them?

4. Do any of the railroads in your State try to prevent fires? Which? In what way?

5. Are propaganda, publicity and educational measures necessary in your State?

6. What is the general attitude of forest owners in regard to burning the forests?

7. What is the attitude of operators (those engaged in getting out forest products) in regard to burning the forests?

8. What, in your opinion, is the best form of fire protection for the different forest regions in your State, State, association or private?

9. Are forest fires in any way connected with the free ranging of stock?

10. What forestry laws have been recommended to the State legislature? What interests have been behind them and why did they not pass? If possible send copies of such proposed laws.

B.—Present Conditions.

1. What is the area of forest lands in your State: (a) In the lands of large owners, lumber companies, etc. (b) Held by farmers or other small owners?

2. What have been the total fire losses in your State, up to the present time, so far as ascertainable? If possible give this in acres burned over, board

E. A. STERLING, SECRETARY OF THE FORESTRY COMMITTEE.

feet of timber destroyed and money loss.

3. What has been the loss in your State the past three years? If possible give this by years, showing area burned over, loss in board feet and money value of timber destroyed.

4. How much loss of life and property other than timber has there been in your State? Please give history of unusually bad fires causing loss of life or property.

5. What has been the loss in tax revenue as a result of forest fires? If all timber, which has been burned, were standing how much would it yearly return to the State in taxes?—this can only be approximately.

6. What is the present stand of timber in your State outside National Forests, and other reservations, and the value of this timber on the stump?

7. What proportion of the taxes of the State are paid by timber owners, aside from farmers?

8. A brief history of State forest legislature in your State and discussion of your present law as to its efficiency, etc. When was a forest law first enacted?

C.—Organized Protection

1. Has actual work been started in your State; if so, when?

2. Was work started by Federal Government, State or private interest?

3. Who were the individuals starting such work, what led to its being taken up and what form did it take?

4. Are there privately financed associations in your State engaged in forest protection and if so what are the names of these organizations, how are they conducted, how much territory is covered by each of them, how long has each been in existence and other information which is pertinent?

5. How much has been expended by privately financed associations in your State the past three years, 1910, 1911, 1912? If possible give this by years, separating patrol fire fighting and improvement work, such as trail building, etc.

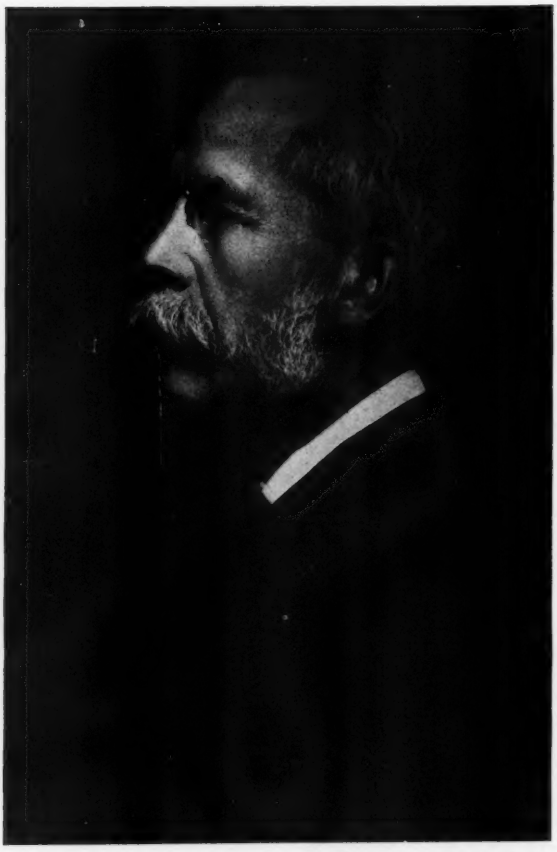
6. Is the object of these associations the prevention of fire through patrol, or simply to fight fires which may become started?

Patrol.

7. What percentage of land outside national forests is being efficiently patrolled?

8. What is your opinion as to the efficiency of individual versus cooperative patrol?

9. What is your opinion as to State control and State financing of patrol



DR. HENRY S. DRINKER, PRESIDENT OF THE AMERICAN FORESTRY ASSOCIATION.

versus State aid with timber owners maintaining and financing their patrols?

10. Who do you consider has the greater responsibility in forest protection, the timber owner or the State and reasons for your opinion?

11. What has been your experience regarding the efficiency of a district or county unit for patrol purposes, as against one agency maintaining patrol over a whole State?

12. How many patrolmen of various classes are employed in your State and the average monthly pay of each class?

13. What qualifications do you seek in employing patrolmen?

WHAT THE REPORTS INDICATE.

The reports so far received from the Northwestern States by this subcommittee on forest fires, and this is one of the most important investigations under way, indicate great activity in forest protection in these States. Not only does closer co-operation between government, State and private interests exist, but each agency is striving to outdistance the others in efficiency of service and intensity of patrol.

Aided by heavy early summer rains the excellent patrols have thus far prevented the loss of any merchantable timber, or other property, although

numerous small fires have started, which, had they not been promptly checked, would have resulted in serious conflagrations. The consensus of opinion among all agencies in the Northwest, engaged in forest protection, is that never before has the preventive quality of strong patrols been so thoroughly demonstrated as this season.

In the four States, Oregon, Washington, Idaho, and Montana, over 20,000,000 acres of privately owned timber are being efficiently patroled by twenty-two patrol associations. These associations, together with the State and Federal patrolmen employed, now have in the field a force of nearly 800 men. In addition to this regiment of trained patrolmen and fire fighters, there is an army of public-spirited citizens, State and county officials, serving voluntarily in an endeavor to stamp out the heavy yearly loss of timber through fires.

Many loggers in the Northwest, in addition to securing the benefits of the association forces, independently employ men to watch their logging works, and take charge of any fires which may start in their slashings.

Incomplete reports on trail and telephone line construction show increased activity along these lines. Private patrols now control many miles of telephone line, and each spring over 2,500 miles of trail, used for protection purposes, must be cleared of logs and brush by the patrolmen. The systematic development of lookout stations has, during the past few years, proven an enormous factor in the speedy location of fires.

Although insufficient reports have been received from other sections of the country, it is fair to assume that similar activity prevails. The committee which is now actively engaged in securing data for a complete report on forest fire protection systems in the United States, predicts that actual achievement looking to elimination of fire damage will surpass that in any other branch of conservation effort.

FOREST TAXATION COMMITTEE.

Another of the very important subjects under investigation is that of forest taxation, and one of the methods by which information is being gathered is described by State Forester E. M. Griffith, of Wisconsin, a member of the subcommittee. He says:

"I am working on the problem of forest taxation in co-operation with our State Tax Commission, who are very much interested in the subject, and were only too willing to help us in every possible way. The Tax Commission have felt as I do that our proposed plan of forest taxation is really more a taxation than a forestry problem, and in order to determine just what would be the exact effect upon the revenues, of a typical timbered county, we are making the following study which I believe will be of real benefit to the National Conservation Congress in considering the matter, namely:

"1. The county has been covered by the State Soil Survey, so that we know which of the lands are really more suitable for forest growth than for agriculture. A map of the county was prepared showing the lands suitable only for forest growth, and then one of our cruisers went over the lands and has reported as to just which of the descriptions contain virgin timber, also those on which the pine has been cut, and which contain second growth timber.

"2. The above work has now been completed, and the State Tax Commission have assigned one of their best men to look up the records and see just what the assessment has been on each description, and what would be the loss in revenues to the county, if a law should be passed providing that all the timber upon non-agricultural land in this county should not be taxed until cut. We are adopting the arbitrary plan that the land itself shall be valued at $2.50 per acre, or $100 per forty, and the land would pay the annual tax.

"So far as I know no such study has ever been made in any county in the United States, and I believe that the

completed report would be of great value to the National Conservation Congress, in determining the actual problems which must be worked out."

In this committee attention is being given to the recently enacted forest taxation legislation passed by the Legislature of Pennsylvania, being a late full pronouncement on this important subject—the acts being drawn after exhaustive correspondence by committees of the Pennsylvania Forestry Association and the Pennsylvania Conservation Association with the State forestry organizations and private associations in all the States.

CO-OPERATIVE FOREST FIRE PROTECTION

DURING the last quarter of the fiscal year the Federal Government entered into co-operative fire protection agreements with the following States: Maine, New York, Minnesota, Montana, Washington and Oregon. These six agreements contemplate the protection from fire of approximately 87,000,000 acres of land on the forested watersheds of navigable streams, for which purpose $51,500 of Federal funds have been made available. There are at the present time 14 States which are engaged in active co-operation of this kind, and it is possible that three new States, Kentucky, South Dakota and West Virginia, will be added by early fall.

The Federal Government, though it has allotted a total of $85,000 for the work of the present session is a minor contributor in the aggregate. Under the impetus given to fire protection of navigable watersheds through this arrangement the co-operating States will expend an aggregate of $3 for every dollar which the Federal Government spends, to which may be added about $2 more from private sources.

These amounts, of course, do not represent the sum total of expenditures for fire protection even in these States. For in some of them the State itself is spending considerably more money in the protection of forested lands lying outside the watersheds of navigable streams. On the national forests, too, the Government is spending several times the amount of its contribution to co-operative fire protection in the States which contain Federal timberland.

Aside from these governmental agencies, the railroads, lumber companies (both individually and through their co-operative protective associations) municipalities and private land owners throughout the country are growing more and more alive to the needs of better forest fire protection and are devoting each year an increased sum to this work.

FOREST PLANTING ON RACQUETTE RIVER.

The A. Sherman Lumber Company, of Potsdam, N. Y., has just caused to be planted on a large sandy tract owned by it along the Racquette River, about 20 miles from Potsdam, 25,000 young white pine trees. These were selected owing to the fact that they thrive well on arid tracts and will mature in a reasonable amount of time in this section, providing a supply of lumber for the company. It was decided to plant white pine only after consultation with forestry experts, and it will be the policy of the company to set out the same number of trees each year for a period of years until the tract is entirely forested.

OPENING 10,000 ACRES FOR SETTLEMENT.

The Government is to abandon a part of its forestry reserve in western Kansas and 10,000 acres of land in it will be open to settlement after August 4. The reserve was set aside seven years ago to experiment with the growing of trees in western Kansas. The land to be thrown open to settlement has been used for grazing purposes, but land men say it will make excellent farming land.

THE RECENT CONNECTICUT LAW FOR TAXATION OF FOREST LANDS

By Herman H. Chapman

UNDER the pressure of public agitation, Eastern States are now seriously considering the subject of rational taxation of forest lands, and legislation along this line may be expected in many States. Statutes of general importance have already been passed, by New York, in 1912, and by Pennsylvania and Connecticut, in 1913. The Pennsylvania law was discussed in the July issue of American Forestry.

A rational tax reform must seek to equalize the burdens of taxation rather than to create privileges. Too often the effort to encourage the growth of timber has taken the form of tax exemptions, rebates and arbitrary or nominal assessed valuation of forest lands. It may be necessary to subsidize the individual, by granting him tax privileges in order to induce him to grow timber, but if such is the case, it is an open question whether the State or towns had not much better undertake the work directly by public ownership of forest lands.

The system of forest taxation adopted by Connecticut seeks to place the owner of forest lands upon an equal footing with other property owners, and make it possible for him to grow timber, not under a State subsidy, but by an equitable plan of assessment.

Private forestry is a business investment. The drawbacks of forestry in common with all forms of business, are the risks and uncertainties of the future, and under the prevailing system, future taxation is one of the worst of these risks. No owner can tell at what time or by what amount his assessment may be increased, or how often this process will be repeated. Even the tax rate may increase greatly with the adoption of an extravagant policy of improvements in the town. The tendency to increase the assessed valuation of woodland property is very pronounced in many localities.

In addition to this risk there is a condition peculiar to forest investments which results in their carrying a heavier burden of taxation than other forms of property of equal value. This arises from the inability of the owner to realize an annual revenue from such property. When an investment is unproductive for a term of years, all expenses must accumulate with compound interest and be charged against the property, until the investment begins to pay income. Under the general property tax, taxes are assessed on value, and not upon income, yet in theory at least, value itself and the ability to pay taxes depends upon income earned. In most forms of undeveloped or unproductive property the improvement necessary to earn income is optional with the owner and annual taxation can hardly be considered an injustice but rather an incentive to use the property rather than let it lie idle. But in the business of growing timber there is no way of avoiding a long period in which all is outgo, and no income. When taxes are assessed annually upon this timber, the accumulating interest upon these taxes may amount in the end to from two to four times the actual taxes paid. That this additional expense for interest imposes an unjust burden upon the owner of growing timber can be easily seen. Modern efforts at forest tax reform have therefore been directed towards the levying of a tax on the timber when it is cut, in lieu of annual taxes on the standing timber. This is, in effect, an income tax, made payable when the income is received.

But at this point a difficulty arises. Revenue derived from forest property is an important item of many town bud-

LAND ON WHICH THE FOREST GROWTH HAS BEEN INJURED BY FIRE AND WHICH SHOULD BE REFORESTED BY THE STATE.

gets. Regularity of income from year to year is essential to the proper maintenance of local governments. A products tax does not promise this regularity. If with the products tax is included a system of greatly lowered or nominal valuation of forest land for taxation, there threatens to be a falling off in the town revenue from forest property which might embarrass the community and cause a shifting of the burden by an increase in the tax rate on the remaining property within the town. Should this happen, the law would be discredited and probably repealed.

THE NEW LAW.

The Connecticut law was framed by a commission composed of the State Forester, the State Tax Commissioner, a prominent agriculturist, an ex-governor conversant with political and business problems, and one of the faculty of the Yale Forest School. The object sought was to provide a system which could be administered by the present town officials without requiring new State machinery, which would not decrease the present revenue of towns, and which would guarantee to the owner of timber lands a definite system of taxation under which he could know what his future taxes were to be, should he continue to grow trees.

The law provides that lands to be listed for taxation under its provision must be examined and approved as suitable by the State Forester, and shall remain so classified until the State Forester cancels the classification, which he may do in case the owner fails to maintain and use the property for forest production. Unlike the recent New York and Pennsylvania laws, Connecticut does not require the owner to manage his property as directed by the State forestry officials and gives the State no arbitrary control over the manner in which the timber is to be cut or the selection of trees to be removed. The owner is free to manage his own property, provided the general results conform to the purposes of the law, and of this the State Forester is to be the judge. This power to cancel the

classification was thought to give sufficient authority to the State, without binding the owner to follow the direction of a State official as to details of management. It is assumed that the advice of the forester will be followed by those for whom he classifies land.

All lands forested or otherwise are included in the scope of the law, excepting land whose value, exclusive of standing timber, is assessed at $25.000 or more per acre. This prevents the classification of agricultural land, and of surburban property as forest land to escape taxation.

In order to obtain a classification, the owner must present to the forester a statement from the assessors as to the value of the property, with land and timber separately listed. This may give assessors a chance to raise values at the time of classification, but on the other hand, it will prevent listing of property for a long period under a value too low to represent an equitable basis for the town.

It takes at least fifty years on most forest soils in the State to produce a crop of timber for any purpose but cordwood. Within this interval there may occur tremendous changes in land values, which can not be neglected for a longer period. For this reason a revaluation of land is provided for at the end of fifty years.

Forest lands under this law will fall into two classes, land upon which the timber is under ten years old, and land on which there is older timber which adds to the taxable value of the property. But the fundamental principle of this law applies to both classes of forest land and is this; both the land and timber now standing on it will continue to be taxed on present assessed valuations. In this way the town is absolutely protected from the possibility of a decreased revenue.

If this is the case, what advantage does the owner of forest lands derive from this legislation? The law specifies two things; first, that the assessed valuation as determined at the time of listing shall not be increased for fifty years, unless the owner abandons the practice of forestry and his classifica-

FOREST LAND MORE SUITABLE FOR STATE THAN PRIVATE OWNERSHIP.

tion is cancelled; second, that while required to pay the local taxes, a limit of ten mills is placed upon the rate that may be levied. These two provisions absolutely protect investors in growing timber from the future risk of increased taxation which they ran under the old system. In return for this guarantee, the owner is required to pay a products tax when timber is cut and sold.

TAX ON LAND VALUE.

Lands on which there is no taxable timber over ten years old are easily provided for. The land alone has value, and upon this value, under the above plan, taxes are paid for fifty years. At that time a readjustment of land value is permitted, which will apply to a second period of fifty years. During this entire time no annual taxes are levied on the growing timber until it is cut, when the owner must pay a tax of ten per cent of its value at time of cutting.

Land now bearing taxable timber presents a more difficult problem.: To permit the listing of such lands at a low valuation or to deduct the value of the timber from the assessed valuation of the property would allow the owner of every piece of valuable timberland in the town to reduce his taxes greatly, and would permit the indefinite holding of woodlands as private parks and luxury forests, without contributing their share to the public treasury. Yet the owner of land bearing half-grown or mature timber is entitled to an equitable system of taxation as fully as the one who plants trees or reproduces a young forest.

The method adopted was simply to protect the timber owner from increased assessments for fifty years. The property continues to pay taxes on its present value. Thus old timber will be taxed quite heavily, while timber not yet mature will not add much to the listed value of the property and the annual tax which it pays will be comparatively light. The products tax upon timber when cut is levied on this class of land also, but since this timber has paid and continues to pay annual taxes, this additional tax on the cut is made very light, being but two per cent of the value for the first decade after listing, increasing by one per cent for each succeeding decade, up to a maximum of seven per cent at fifty years.

By these devices it is hoped that all three of the main objects of tax reform on forest property may be secured.

The owner is relieved of all uncertainty and risk, the burden of compound interest on back taxes is lifted from that portion of the value represented by the timber crop, and the revenue of the town and county is not reduced.

THE OBJECT OF THE LAW.

It is true that the owner still pays annual taxes on the land, and where mature or taxable timber is listed, he pays annual taxes upon the timber values as well. To this extent he still bears the burden of compound interest on values which are producing no annual income. But the object of this law is to encourage the production of new crops of timber rather than the preservation of mature trees. Old timber, except when used for parks, should be cut, and a system of taxation which necessitates the cutting of such trees is not an unmixed evil. It is far more important to stimulate the growing of young timber than to encourage the indefinite holding of mature trees, and by the plan of accepting the present value of timber lands as the basis of taxation, the double purpose of continuing the tax on old timber and relieving future crops of young trees from excessive taxation, is accomplished automatically. This arrangement thus provides for the taxation of lands growing timber of any age and condition, and is evidently not a subsidy, rebate or privilege. It as an equitable bargain between the land owner and the community, by which the owner agrees to pay his fair share of taxes, and the community guarantees fair treatment as to the terms and time of payment.

PRIVATE FORESTRY.

These inducements should be sufficient to encourage private forestry wherever other economic conditions are favorable. There is much barren and

WHITE PINE STAND, WHICH PROMISES GOOD RETURNS AS AN INVESTMENT.

waste land in the State, worth almost nothing in its present condition. Under this law an owner who creates values by planting such soils will have an absolute guarantee that he can grow his crop to maturity without its value being confiscated by greedy tax assessors, seeking for something to levy upon. Under such a system, the towns may eventually secure a greatly increased revenue from the ten per cent tax on timber grown on land which would otherwise be allowed to burn over and remain unproductive. But in some regions the difficulties and discouragements confronting the private owner are too great to be overcome by mere tax reforms. Even with an equitable system of taxation, the financial returns from forestry in such regions may not be sufficient to induce owners to raise timber.

Under these circumstances, State Governments following the example of Pennsylvania, may either buy and manage these lands, or may, by reducing the assessed value of the lands to a nominal sum, taking the tax off of the timber, and even allowing the State to pay to the towns, taxes on their private lands, thus subsidize and encourage private owners to assist the State in reforesting their waste lands. There is some merit in the argument used to justify the payment by the State of road and school taxes on private lands managed as forest reserves. It is claimed that while the benefits to the State, and to large cities, coming from the production of timber, are well recognized, though indirect, yet the land owner is left to stand the expense and risk of timber production. At the same time the area in need of reforestation is so large that the State can not hope to fully cope with the problem of acquiring title and managing more than a small per cent of the total. Hence the State should subsidize the private land owner to encourage him to assume work which has as its main object the benefiting of the community. Connecticut has not yet reached the point where such a course is considered desirable and it will probably never become necessary.

There are several minor administrative details in the Connecticut tax law worth mentioning. The first is that providing for revaluation of land after timber is removed. When timber is cut from land whose assessed value includes this timber, the owner, provided he reforests the tract, may be allowed to continue the existing valuation if he is satisfied with it, to the expiration of the fifty-year period or he may secure a reassessment, and list the property for a new fifty-year period under the clause covering land bearing no taxable timber. In this way property bearing old timber which will be greatly decreased in value by the removal of this timber, may be continued as forest land on a reduced valuation.

The difficulty of determining whether to tax an owner on the fire-wood, fence posts, and other material which he uses on his property, was solved by providing that the products tax should not be levied upon material cut for domestic use. Such use is limited to fuel and to the construction of fences, buildings or other improvements which tend to develop the property of the owner and increase its taxable value. This is logical, since the property so improved is not the woodland, and will undoubtedly be assessed at a higher value of any expensive construction is undertaken. It would be unfair to tax the owner on his timber, and then tax him annually thereafter on the house which he constructs from it. But the law specifies that this material must be used upon the property of the owner and be situated in the same town as that in which the woodland lies.

DETERMINING VALUES.

To determine the value of material taken, the owner must file a sworn statement of the quantity and stumpage value, before the timber is removed from the land. This valuation the assessors have the right to revise. Should the owner be unwilling to accept this alteration, he may appeal to a board one of whom is the State Forester, the others being the first selectman and

COPPICE FOREST WHICH CAN BE PROFITABLY HANDLED UNDER PRIVATE OWNERSHIP.

Town Clerk, The owner is permitted to remove timber before cutting is completed, by depositing a sufficient sum to cover the tax. To insure collection, both the land owner and the purchaser of the timber are made jointly liable for the amount of the tax.

There is always the possibility under such taxation laws, that land owners, after receiving the benefits of this regulated taxation for a period of years, will then abandon the undertaking, allow their classification to be cancelled, and while failing to produce timber crops as anticipated by the law, would still be ahead the taxes saved for the past period. In the Pennsylvania law, the actual amount of back taxes on the old valuation is computed, adding legal interest on each payment, and the difference between this total and the total actually paid, with interest, is assessed and collected when the classification is cancelled. This involves considerable bookkeeping, and the Connecticut law adopted a simpler, though more arbitrary, plan for securing an equitable payment of back taxes. Should the classification be cancelled the property is then revalued for taxation. If there has been an increase in value as shown by this new valuation, the owner must pay back taxes on this difference. But as the increase is assumed to have occurred gradually a tax of half the maximum rate of ten mills is stipulated, this tax to cover the entire back period. This is an equitable arrangement, and avoids the necessity of calculating actual back taxes. Interest is not collected. There would be a question as to whether simple or compound interest should be assessed, and it was considered wiser to demand merely the present cash equivalent of a tax of five mills on the increased value of the property.

No law is in permanent or satisfactory form whose operation will tend to create conditions which will arouse a demand for its repeal. In States like Iowa, where exemption laws on property planted to trees were widely taken advantage of, repeal followed as a matter of course. It is hoped that the system of taxation adopted by Connecticut has indicated the means by which a safe and practical transition may be brought about from the present system of forest taxation to a new system without unduly disturbing the economic and financial conditions in the towns affected even if every acre of forest property is eventually listed.

TRYING TO FIND USES FOR AILANTHUS

EXCELSIOR can not be made from any or all woods. According to the popular notion it is a product of wood waste, but this is not usually the case. For example, the Forest Service, which has been experimenting to discover uses for ailanthus, sometimes known as Paradise Tree or Tree of Heaven, finds that it probably will not make good excelsior.

There are great quantities of ailanthus in the East, and espécially in the Ohio and Mississippi valleys, where it has been naturalized from specimens introduced from China until it is now more abundant than some of the native species.

Its wood has been used in small quantities for boxes and crates, but no other use has been reported. The Indiana State Board of Forestry and the Forest Service co-operated in securing a small consignment for an excelsior factory, where it was found that ailanthus does not work up into good excelsior because the product was not springy and the strands tended to break and crumble under pressure. This may have been due in some measure to the fact that the wood has been kiln dried, and further experiments will be undertaken to see whether air-dried material, after a six-months' seasoning, will be more satisfactory.

A RECORD OF FOREST WORK IN HAWAII

THE Report of the Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii for the biennial period 1911-12, recently received from Honolulu, shows that that Territory is awake to the importance of forestry and actively at work putting it into practice.

In Hawaii forestry means essentially one of two things, forest protection or forest planting. The present report outlines the reasons why both are necessary and described what is now being accomplished.

The full report of the Board is a book of 258 pages, illustrated by 36 full-page plates, covering the work of its three divisions, Forestry, Entomology and Animal Industry. The section on Forestry, which is also issued as a separate report, occupies 56 pages, with 20 plates. The plates accompanying this part of the report are reproduced herewith, as being of more than local interest.

Preceding the report of the Division of Forestry is reprinted a paper by Mr. Walter M. Giffard, President of the Board of Agriculture and Forestry, presented to a Joint Committee on Forestry of the Hawaiian Sugar Planters' Association and the Board of Agriculture and Forestry, entitled "Some Observations on Hawaiian Forests and Forest Cover in their relation to Water Supply." A comprehensive statement of the underlying reasons why the native Hawaiian forest ought to be protected, this paper contains certain observations on the character of Hawaiian forests not elsewhere available in print.

The section allotted to the Division of Forestry consists of reports by the Superintendent of Forestry, Ralph S. Hosmer; the Forest Nurseryman, David Haughs, and the Consulting Botanist, Professor Joseph F. Rock.

Mr. Hosmer briefly outlines the reasons for practicing forestry in Hawaii, showing that for the greater part of the native forest, water, not wood, is the important product and that therefore the forest should be so managed as to insure the greatest possible continuous yield of water. The plea is made for the better protection of the forests on the watersheds, especially through fencing and the eradication of wild cattle now at large in certain of the forest reserves, and it is pointed out how this can be accomplished by the use of funds derived by the Territorial Government from leases and licenses of water rights on streams rising in the forests.

The whole argument is summed up in the following paragraphs, quoted from the report:

"In Hawaii with its short, steep watersheds, the limited area of its catchment basins and the great and sudden fluctuations in rainfall, even in the supposedly wet districts, it is of paramount importance that a cover of vegetation be permanently maintained on the slopes of the mountains whence come the streams that feed the irrigation ditches. On the continuance in good condition of large tracts of forest depend the prosperity and well being of many people, for a body of forest reacts favorably on the region adjacent to it in many ways.

"In our present state of knowledge we may not know just how this influence is exerted, nor how far reaching its effects, as for example on local climate and on health. But it is the experience of mankind that a body of forest is a valuable asset, a heritage which ought not to be jeopardized through neglect or mismanagement.

"With the outlook for the future what it is in this Territory today, the time has unquestionably arrived when greater care must be given to the forests. Fencing, the extermination of wild cattle and goats, the extension of the native forest cover, are all things that urgently call for prompt and energetic attention. The protection and

AN IRRIGATION DITCH IN THE FOREST.

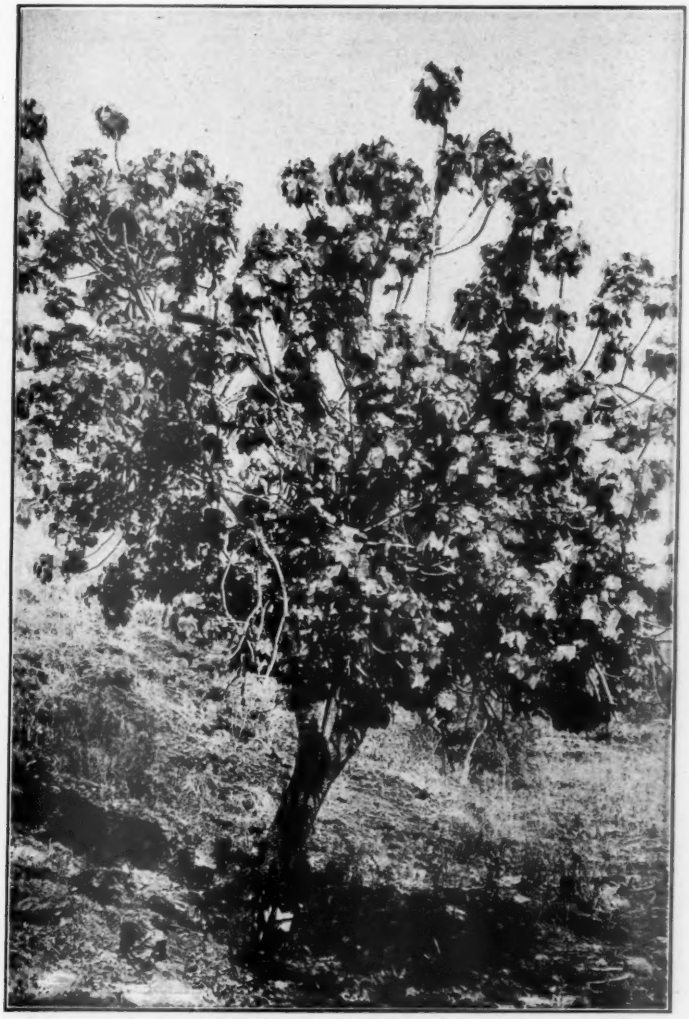
right use of the native Hawaiian forest is an issue that concerns all the people of the territory, large interests and small land holders alike, for everybody uses water. The need for water is a common need. A well-kept forest cover on the watersheds is essential to an assured supply."

The Division of Forestry was organized in 1903, but systematic forest work did not begin till the following January, at which time Mr. Hosmer took office as Superintendent of Forestry. In the past nine years the first work of the Division has been the building up of the forest reserve system. There are now 27 forest reserves in Hawaii with a total area of 683,101 acres, of which 454,810 acres, 67 per cent, is land belonging to the Territorial Government.

WHERE THE FOREST GIVES PLACE TO GRAZING LAND. A FOREST FENCE.

During the past two years four new reserves were added to the chain, two on the Island of Hawaii, one on Molokai, and one on Maui.

Passing to the second main line of forest work, the encouragement of tree planting, it is shown that in the past two years more seedling trees than ever before were distributed from the Division of Forestry nurseries at Honolulu and the sub-stations at Hilo, Hawaii, and Homestead, Kauai, the totals being 620,739 for 1911, and 806,537 for 1912. Tables show the total number of trees reported planted by sugar plantation companies and other corporations throughout the Territory. For 1911, the figure is 1,134,940; for 1912, notwithstanding that it was a phenomenally dry year, 1,303,698. When these figures are compared with 1908, when 498,677 trees were reported set out, the increase of



KOKIA ROCKII LEWT. KOKIA.
One of the healthy cotton trees.

interest in tree planting in Hawaii is very apparent.

Some space is given to experimental forest planting and to plant introduction work, which it is recommended be given more attention. In Hawaii, even in the few localities where the native forest is not more needed for water protection than for producing wood, the indigenous tree species are not well adapted for general commercial utilization, being essentially cabinet woods. The two Hawaiian trees that have commercial value, Koa (*Acacia Koa*) and Ohia Lehua (*Metrosideros polymorpha*), are both cabinet woods. There are of course many other trees that as individuals produce wood that is beautiful in grain and in texture, but they are too scattering in their distri-

EUCALYPTUS ROBUSTA WINDBREAK, NUUANU VALLEY PLANTATION.
Two years and ten months from seed. Rows of Eucalyptus corynocalyx at left.

bution to have market value. This has led naturally, in the forest planting that for thirty years or more has been in progress in Hawaii, by the local government and by corporations, to the introduction of trees producing wood suitable for construction purposes, more particularly the rapid growing Eucalypts from Australia, with the Ironwood (Casuarina) and Silk Oak (Grevillia) and the Japanese Cedar (Cryptomeria).

It will be a long time before the cargoes of Douglas Fir and Redwood lumber going to the islands from the Pacific Coast will be much reduced because of local forest plantations, but there seems no good reason why the groves now being set out should not in time largely supply the local demand for such minor uses as posts, ties, bridge timbers and

IE-IE VINE ON OHIA LEHUA TREE.

the like, not to speak of fuel, in those districts where the Algaroba (*Prosopis juliflora*)—a highly useful tree in Hawaii — does not grow. With the great diversity of natural conditions in Hawaii, due to differences in elevation, and exposure to the trade winds, and their accompanying moisture-bearing clouds, it is important to find other trees of economic importance adapted for use in each typical locality. But as experimental introduction of trees is at best uncertain, this is work that has to be carried on by the Government rather than under private auspices. Many useful introductions have already been made into Hawaii. If the recommendations of the Division of Forestry are carried out, other valuable trees ought in time to become established there.

For the past few years the appropriation for the Division of Forestry has

THE KOKO OR AKOKO.
A Hawaiian Rubber-producing Tree.

been between $10,000 and $12,000 per annum. Since the receipt of the report it is pleasant to note that a further message from Honolulu tells of the passage by the Legislature of an act making available some $32,000 a year for forest work. This will permit the carrying into effect of the more important of the recommendations made in Mr. Hosmer's report, particularly those having to do with fencing. The new law (Act 57 of 1913) is the result of a long campaign of education and much hard work by many men. Its final passage was primarily due to the efforts of the Special Joint Committee on Forestry to which was addressed Mr. Giffard's paper, referred to above.

Taken by and large, Hawaii has good reason to be proud of the place she holds in forest work. For many years the scene of increasing interests in tree

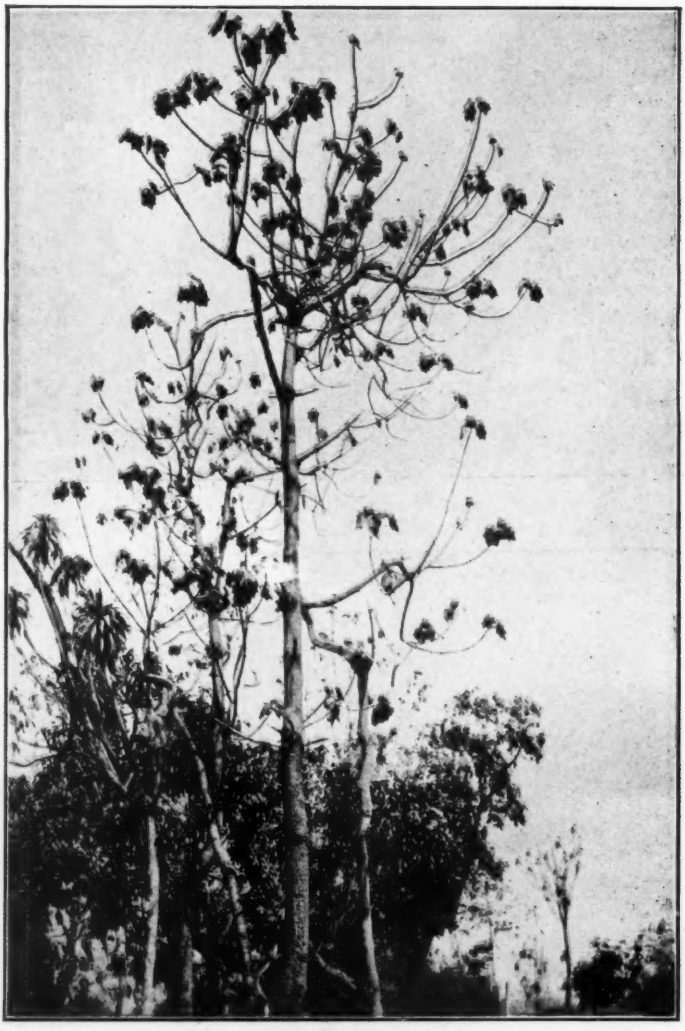
A HAWAIIAN PROTECTION FOREST.

THE ULTIMATE RESULT OF FOREST DESTRUCTION.
Two-thirds of the Island of Kahoolawe is like this.

PAPAPAHOLAHOLA SUB-NURSERY AND EXPERIMENTAL PLANTING GROUND, HOMESTEAD, KAUAI.

planting by corporations, there has been built up in the Territory during the last decade a forest reserve system that if properly administered, will efficiently protect the watersheds of the streams that spell prosperity for the islands. With the increased appropriation that is now made available it will be possible to begin such an administration of the forests and to put into effect recommendations that have long been advocated.

The next two years cannot but show a decided advance in forestry in Hawaii. The Territory is to be congratulated on its standing in forest work.



KOKIO ROCKII LEWT.
The majority of the trees are in a dying condition

THE NEW LAW.

A statement regarding the new law says:

The Legislature of the Territory of Hawaii, at its biennial session ending on April 30, 1913, enacted among other good legislation a couple of laws that are of far-reaching importance in the history of Conservation in that Territory. For a number of years the Hawaiian Forest Service has been conducting a campaign of education to secure adequate appropriations for the better protection, especially through fencing, of the areas of indigenous forest constituting the Hawaiian forest reserves on the catch-

ment basins of the streams that are important as sources of water for irrigation. Two-thirds of the sugar raised in Hawaii is irrigated. Without the forest cover the flow of the streams could not be depended on. Hence, as sugar is the chief industry of the islands, forestry, especially as exemplified by the maintenance of protection forests, plays a highly important part in the well-being of the Territory.

During the past ten years a chain of forest reserves has been built up in Hawaii. There are now 27 in the list, with a total area of 683,101 acres, of which 454,810 acres, 67 per cent, is land belonging to the Territorial Government.

For the past four years the U. S. Geological Survey has co-operated with Hawaii in making careful measurements of the flow of the streams coming from the forests. This work has been carried on by men from the Water Resources Branch of that Bureau.

Act 56 of the Session Laws of 1913 of the Territory of Hawaii establishes a Division of Hydrography under the Territorial Board of Agriculture and Forestry, co-equal with the existing Divisions of Forestry, Entomology and Animal Industry.

Act 57 provides, in equal parts, money for the conduct of the Divisions of Forestry and Hydrography by setting apart as a special fund the revenues derived by the Territorial Government from leases and licenses of water rights on streams coming from the forests. The amount so made available is approximately $67,000 per annum. The annual allotment for the Division of Forestry for the past few years has been between $10,000 and $12,000 per annum. The increase of $20,000 a year for the next biennium will permit the carrying out of work which the Division of Forestry has for years been recommending. It is a decided step in advance; the ultimate result of persistent hammering that has at last resulted in the attainment of the object sought.

The final passage of these two laws, both of which were Administration measures, having the cordial support of Governor Walter F. Frear, was largely due to the efforts of a special joint committee made up of members of the Territorial Board of Agriculture and Forestry and of the Hawaiian Sugar Planters' Association.

The next two years will see in Hawaii the accomplishment on the ground of work that has long been advocated. It is a good example of forestry that will be practiced in the forest.

POWER PLANT ON A NATIONAL FOREST

THE Secretary of Agriculture has issued a permit to the Tin Cup Gold Dredging Company, of Denver, Colorado, for a waterpower plant to be built upon Chalk Creek on the Leadville National Forest near St. Elmo, Chaffee County, Colorado.

The power will be transmitted across the Continental Divide at an elevation of about 12,000 feet and will be used to operate a gold dredge at Tin Cup, Gunnison County. This is the site of a placer and lode mining camp of earlier days which had been practically abandoned until the advent of the Tin Cup Company. This company with its modern machinery can work over ground which would not have paid under old methods.

The dredge is approaching completion and it is planned to begin construction upon the power plant immediately in order that the power may be available at an early date for mining operations. The first installation will amount to about 300 horsepower, but if dredging operations prove successful, more power will be required involving additional developments upon Chalk Creek.

MANAGEMENT OF WHITE PINE FORESTS

By A. F. Hawes, State Forester of Vermont *

THE most profitable forest for Vermont, and for that matter, for all New England, except for the high elevations, is one composed of white pine with a very little admixture of other species. Such a forest in which one species constitutes 80 per cent or over of the whole forest, is called pure. European experience indicates that while absolutely pure forests may be more profitable for a time, they tend in the long run to wear out the soil, just as does the continued raising of one agricultural crop. To furnish humus it is therefore very desirable, in a pine forest, to have a slight admixture of deciduous species, preferably of shade-enduring varieties, such as maple or beech. In planting, this can be accomplished by interspersing belts or groups of such trees. Such deciduous belts have the further advantage of serving as fire lines, since a crown fire sweeping through the tops of a pine stand is effectively checked by a barrier of this nature.

White pine is extending its range naturally throughout northern New England. In many of the higher valleys where abandoned pastures are now coming up to pine, the older farmers say that in their boyhod pine was unknown in their sections.

Vermont, a half century ago, was a great sheep raising country. Today the business is nearly dead. Many of the lands now reproducing to forests were in those days profitable for farming.

In time many areas may be again so employed. In the meantime, they may profitably be used for a quick-growing crop of white pine which may be harvested in from forty to sixty years, when the soil will have been much enriched. This function of the forest for improving soils has not been given enough weight. In the future agricultural economy of the country it will be recognized.

The pine stands on abandoned pastures are even aged, i. e.—the trees do not vary in age by more than a dozen years. The plan of treatment depends upon the age, and is much simpler than in an all aged stand, such as our virgin forests.

PINE 10 TO 20 YEARS OLD.

Oftentimes in these stands the pine has grown under, or with gray birch, poplar, or some other tree of comparatively little value. There are sometimes as many as three thousand trees to the acre. These inferior species not only take up room but rub the pines, and often seriously injure them. They should be cleaned out, leaving the pines unmolested. Such a thinning is called a "cleaning." The material cut is probably too small for use, so the cleaning calls for an investment. Much of this growth may be broken off easier than cut. No pines are cut at this period. It will take about two days' labor to clean an acre in this way, so if the wood is too small to use it means an investment of about $3 an acre. Made in the fifteenth year this investment would amount at the legal rate of interest—6 per cent—in the fiftieth year to the equivalent of an expenditure of about $25 an acre. It is easy to believe that such a cleaning would entail an added value to the property at least equivalent to this sum, enabling it to grow at least 3,000 or 4,000 feet more, and doubtless better lumber.

It is not advisable to prune pines at this period, for the limbs are needed to develop food and will be killed out if the trees are sufficiently close. If there are large openings—say fifty feet across—they should be planted up with pine transplants. Smaller openings

*See Bulletin 156 Vt. Agr. Exp. Station. A. F. Hawes.

TYPICAL PASTURE-GROWN WHITE PINE, 50 FEET HIGH; DIAMETER, 20 INCHES. CONTENTS, ABOUT 300 BOARD FEET. NOTE THAT LARGE LIMBS PERSIST TO THE GROUND, MAKING INFERIOR KNOTTY AND TAPERING LUMBER.

TYPICAL FOREST-GROWN WHITE PINE, RICHMOND, VT. HEIGHT, 80 TO 90 FEET; CONTENTS, 800 TO 1,000 BOARD FEET. NOTE THAT THE CROWN OCCUPIES OVER ONE-THIRD OF THE TOTAL HEIGHT, WHICH INSURES THE BEST GROWTH.

should not be planted, as the little trees will be simply overtopped by those on the edge. In cases where the pine has grown in dense thickets without any admixture of other species, there is no call for a cleaning, but towards the twentieth year, after the lower limbs have died, a light thinning may be made.

PINE 20 TO 50 YEARS OLD.

When white pine has reached the age of twenty years it has a diameter, unless too much suppressed, of from 3 to 8 inches and the wood is, therefore, usable for fuel. At this period in the life of a pine forest a very fast growth is made, often as much as two feet a year in height. This fast growth means an intense struggle for existence where the trees are crowded. In order that the greatest possible amount of lumber be made it is necessary for the trees which are to be matured to have a living crown at least one-third their total length.

In many of our forests the natural struggle for existence goes on so long that the number is too much reduced and the crowns so weakened that they can not take advantage of the increased amount of light and air. It must be remembered that a tree never produces branches except at the top and for this reason it does not pay to leave crippled-topped spindling trees. Many forest owners have the false impression that good forestry depends on the removal of the large trees, always leaving the small ones. As a matter of fact in forests under fifty years it is usually the other way around. This common mistake about forestry is easily understood when it is realized that the selection system or diameter-limit method of final cutting is best understood, and that the lay mind does not distinguish between a thinning and final cutting. In the former case, which is the one under present consideration, the purpose is to develop the best pines. Consequently the small ones are cut out. The larger ones are now growing at their most rapid rate. If cut, the best growth would be lost and the smaller remaining trees would grow very little.

A thinning of this nature was recently made in the pine forest belonging to the University of Vermont. These grades of material were marketed at the following stumpage prices: Lumber at $8 per M (sold by the Champlain Rule); stave wood 4-inch by 6-inch at top for $1.75 per cord (5 feet by 8 feet by 4 feet), and fuel for lime kilns at $1.25 per standard cord. This forest was about two miles from the lime kiln where the material was used.

Prof. Knapp recently advocated in AMERICAN FORESTRY the pruning of the best pine trees for one log length. It is quite possible that with the great differences between first-grade and box boards that a certain amount of this work may pay. However, the indiscriminate pruning, or rather hacking off of limbs, which is the common idea of forestry, should be severely criticised.

PINE FOREST OVER 50 YEARS OLD.

There are two yield tables in general use in New England for white pine.* Larger yields are given by the Massachusetts table, e. g., at 50 years the best soil by Massachusetts table produces 55,150 board feet per acre, by New Hampshire table 47,450; the poorest soil by the Massachusetts table 37,550 board feet, by the New Hampshire table 27,650 feet. Indications are that for natural stands in northern New England, at any rate, the more conservative table is more correct.

However, there is good evidence that plantations, or well-managed stands of pine, may even surpass the figures given in the Massachusetts table. Mr. E. S. Bryant, after a recent study of a plantation near Gilboa Station, N H., which was 41 years old, and covers 2.57 acres, reported that the average stand per acre of live trees was 35,000 board feet. According to the Massachusetts table the average stand at 40 years on the best soil is 40,650 board feet, and on medium soil 32,800 feet.

*N. H. Forestry Com. Report 1905-'06. "Mensuration of the White Pine in Mass."

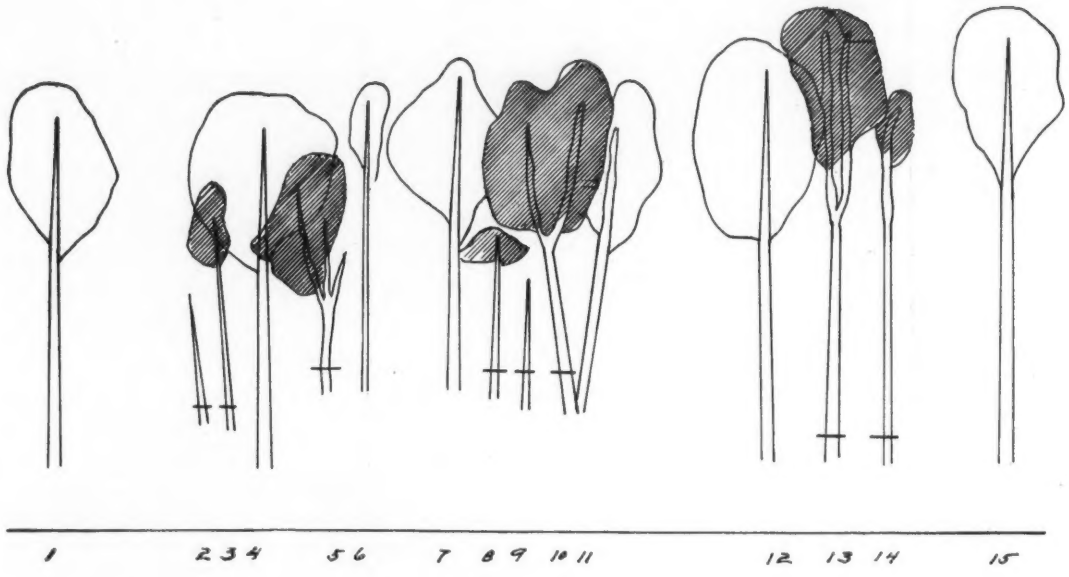


Fig 2a

GROUP OF PINES TWENTY-FIVE YEARS OLD IN NEED OF THINNING. NO. 10, A LARGE INFERIOR BIRCH, WILL BE REMOVED TO HELP THE PINE 7, AND THE GOOD BIRCH 11. 5 IS A BAD FORMED TREE, WITH A TOP SERIOUSLY INJURING 4, WHICH IS A SPLENDID PINE, AND 6, WHICH IS SPINDLING, BUT MAY LIVE IF FREED FROM 5. 3 IS SUPPRESSED AND WILL ONLY INJURE 4 IF LEFT; 2 IS DEAD. 8 AND 9 ARE DEAD OR DYING. 13 IS A DOUBLE TOPPED POOR PINE AND WILL BE CUT TO HELP 12. 14 IS NEARLY DEAD AS MAY BE SEEN BY ITS SMALL TOP AND MAY BE CUT.

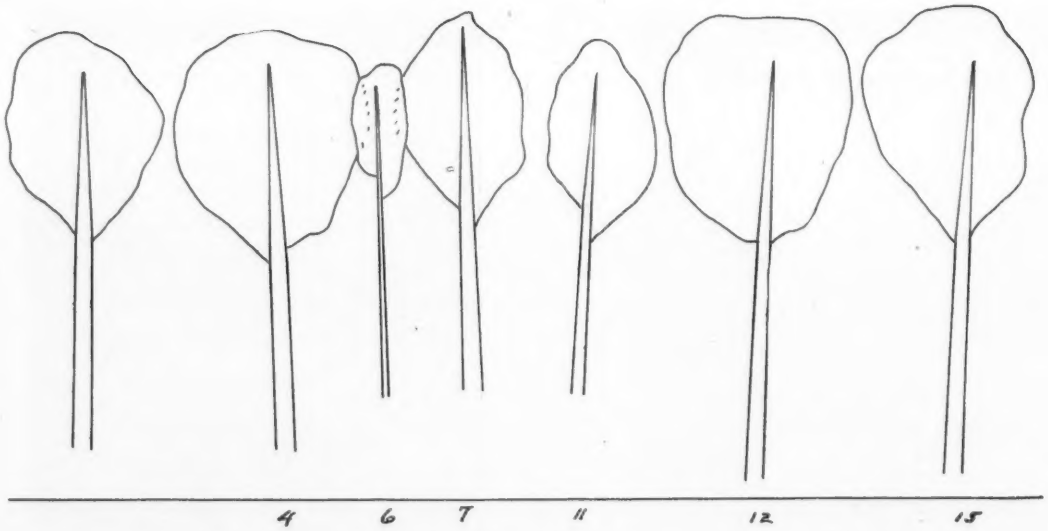


Fig. 2 b.

THIS REPRESENTS THE SAME GROUP AS 2 A, TEN YEARS AFTER THE THINNING DESCRIBED ABOVE. THE TOPS HAVE NOW COME TOGETHER AND THE FOREST WOULD NEED ANOTHER THINNING. 6 STILL HAS A SMALL TOP AND IS SPINDLING, AND IT IS A QUESTION IF IT WOULD NOT HAVE BEEN BETTER TO HAVE REMOVED IT AT FIRST.

BEFORE THINNING. WHITE PINE 30 TO 35 YEARS OLD. TREES TO BE REMOVED: 80, DIAMETER 4″, HEIGHT 44′; 84, DIAMETER 7″, HEIGHT 45′; 88, DIAMETER 6″, HEIGHT 49′; 96, DIAMETER 6″, HEIGHT 46′; 100, DIAMETER 5″, HEIGHT 31′; 103, DIAMETER 4″, HEIGHT 20′.

AFTER THINNING. TREES LEFT: NOS. 81, 82, 83, 85, 86, 87, 89, 90, 91, 92, 93, 94, 95, 97, 98, 99, 101, 102, 104, 105.

Photos of University of Vermont forest lands at Burlington.

A few years ago I measured a plantation 70 years† old in Strafford, Conn., which had an average stand of 60,360 board feet per acre. The New Hampshire table gives for this age 65,900 board feet for best soils, and 55,800 for medium soils. It must be borne in mind that neither the plantations here referred to, nor the natural stands upon which the tables are based, had been properly managed, so they do not represent the maximum obtainable. At a stumpage value of $8 per thousand, these two plantations are worth $280 and $480 per acre, respectively, not counting the fuel from dead trees and tops. In other words, they, curiously enough, produced $6.83 and $6.85 per acre per annum for 41 and 70 years, respectively.

The best rotation suggested by the yield tables is about fifty years, but when the relative value of large good quality pine is taken into consideration, and the increasing prices of stumpage, it seems wise to hold part of the stand, at any rate, to a more advanced age. Under the "Shelter Wood System" which has been applied by the Harvard Forest School in its forest at Petersham, and by the University of Vermont in its smaller forest, splendid reproduction is secured in a few years, after the first opening up of the stand. If this is about the age of fifty the remaining stand will make a very rapid growth during the next ten or fifteen years, when it is necessary to remove it in order that the reproduction be not suppressed. This removal if done carefully will injure the young growth very little.

Few forest trees bear seed every year and the white pine is rather more irregular than are most trees in this regard. There is a common saying that the pine bears a seed crop only once in seven years. This notion, however, is incorrect. There was a good seed crop in Vermont in 1907, and another in 1910. This latter crop was very uneven, for in certain localities—as Essex and Colchester, Vermont—there was a good crop, while in other nearby regions—as Milton—there were almost no cones. It takes two years for the pine cones to mature. At the end of the first season the cones are about one inch long and of a purplish color. The mature cones begin to open early in September and the seed blows out and is carried by the wind for considerable distances.

In order to collect the seed it is necessary to gather the cones before they open. This can best be done where lumbering in pine is being done in the fall, picking the cones from the tops on the ground. In most regions the squirrels help materially by dropping the cones to the ground before they have opened. While this is a help to the collector it is a damage to natural seedling. Some large-topped pines will yield from two to three bushels of cones, which carry anywhere from 50,000 to 100,000 seed. It will be seen from this that a few such trees scattered over a tract are important factors toward its restocking. The seed is carried in large quantities twice the length of the tree and much of it considerably farther. It germinates best where there is plenty of light, as in an open pasture at the edge of the woods, or in an opening caused by windfall. The little seedlings require a great deal of light and will soon die if they do not have it.

These facts are important reasons for making cuttings in a pine forest the season following a seeding. On account of the length of time required to mature the cones it is always possible to know a year ahead when there is to be a good crop, and the harvest should be planned accordingly. If the cutting is made in the fall or winter following seeding, the ground is covered with seed, which germinates well on the soil stirred up by lumbering and grows well with the increased light. If made the year before, the seed from these trees will be lost and if made the year later, it would have germinated and mostly died. This explains why it is that occasionally one finds a splendid second growth of pine following the cutting of pine, but that more often one does not.

†Conn. Forestry Publication No. 4.

THE WHITE MOUNTAIN FOREST AND HOW IT IS TO BE MADE USEFUL*

By William L. Hall, *Assistant Forester, U. S. Forest Service*

LAND ought always to be so used as continually to increase in usefulness to man.

The principle here stated is of direct application to the gardener, farmer, and forester who produce crops directly from soil. It doubtless has application also, in the utilization of the stored, unreplenishable resources of the earth, especially in making available those resources with continually lessened cost and reduced waste. Again, the principle of so using land as continually to increase its usefulness has application in a large way to entire geographic districts, not only in the useful products which may be brought forth, but in the services rendered to entire communities, States and Nation.

On this general principle the work of the husbandman who improves and restores in greater measure than he harvests and removes, contrasts sharply with the operations of the exploiter who gathers where he has not strewn, and puts nothing back again.

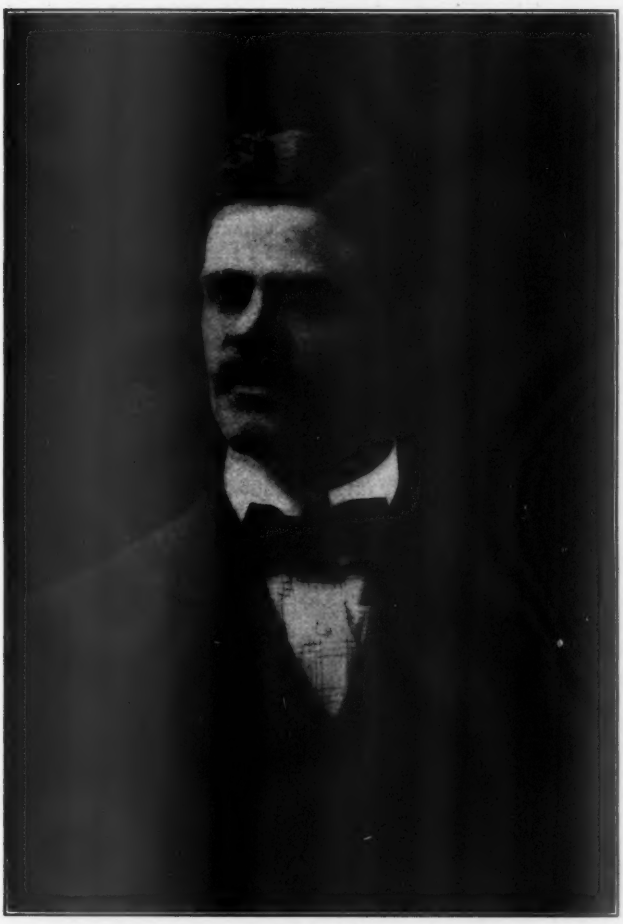
We have been passing through a period of exploitation, both in land fertility and in timber resources, and now that the native stored up supplies have been considerably diminished, we are driven to recognize the vitality of this principle of the right use of land, simply because the following of any other would, in time, land us in disastrous conditions.

The recognition of this principle as being the one which properly should govern agricultural operations, is now quite common on the part of the thinking public. All will agree, unless it be the farmer, himself, that he should so manage his soil that the crops of the future may be larger and more valuable than those of the present, and not only that individual crops may be larger, but speaking broadly, that the land and open country may serve mankind more usefully in giving a living and in making life better and more enjoyable. Founded squarely upon this principle are some of the well-known institutions of our day, the United States Department of Agriculture, the State agricultural colleges and experimental stations, and rural life commissions. All of these are laboring to bring about the general acceptance of this principle and to square farm conditions and processes by it. In the same field, many writers, lecturers, and journals are working independently, and even church and school workers have recently become quickened to great activity. Last of all, the farmer himself is becoming imbued with this idea which forms the basis of what we may call the "new thought' so far as it pertains to rural life.

FEDERAL FOREST WORK.

Likewise, in general thought, we have recognized the principle as applied to the timber resources, and several tangible results have already appeared. The first is that a new profession, that of forestry, has been established and departments, divisions and schools of forestry have been inaugurated to foster and support it in many of our educational institutions. The Federal Government has gone into forest protection and conservation on so vast a scale that it protects about one-fourth of all the timber lands in the country. Many of the States becoming imbued with the new idea have turned their attention, some of them in a large way, to the protection of the forests in order that from year to year they may, more and more, serve the needs of the people. A great deal of educational work has been done by these agencies among the lumbermen who control by far the bulk of

*An address at the forestry conference at Lake Sunapee, July 23, under the auspices of the Society for the Protection of the New Hampshire Forests.



WILLIAM L. HALL, ASSISTANT FORESTER.

the forest lands and in great numbers they have been brought to realize the intrinsic and permanent values in the timber under their control. In some regions they have organized themselves into Forest Fire Protective Associations, co-operating along well-directed business lines to overcome the baneful effect of fire, which has always been the greatest enemy of the American forest. Furthermore, a good many lumbermen, on the basis of plans which they are working out themselves and with the aid of foresters, are endeavoring to protect the young timber so far as possible, with the expectation that the cutting which they now do in the virgin forest may not be the last, but that they may return at some later time and find another crop of timber, perhaps as valuable as the present one.

The operations of the Federal Government in acquiring lands under the Weeks Law throughout the Appalachian region is based absolutely upon this same principle of so managing the

land that its usefulness in the future will grow rather than diminish.

DEPLETING THE FORESTS.

The use of the Appalachian region between 1790 and 1910, with the exception of a few localities, was in direct violation of this principle. Nature had stored up wonderful supplies of fertile soil and excellent timber and during these 120 years men simply dipped in wherever they liked and took out whatever they wanted and exercised no care over the balance. At first, this practice produced no noticeable results because of the vastness of the stored-up supply, but at the end of a hundred years, results began to be felt and thereafter from year to year they were experienced with increasing intensity. They were realized in the loss of a very large portion of the valuable timber by cutting and burning; they were felt in the loss in the fertility of the cleared lands; they were seen in the sudden and rapid increase in floods and as a consequence the loss of valuable property, such as live stock, buildings, fences, and manufactories along the rivers, and they were seen even in the washing away of the valley farms which were perfectly safe before the time of exceptional flood increase. The loss was still further noticed in the rapid deterioration of the streams for power and navigation purposes and for city water supply.

If we cease now that practice of needless exhaustion of the resources of this wonderful region and set to work in settled determination on the principle of handling the Appalachian region in such a manner as continually to improve its usefulness to the Nation we shall soon note a vast change in its conditions. It will be a change as radical and complete as we sometimes see in a man, who after half a life misspent in idle and selfish ways, is transformed by the acceptance of a new principle and turns himself with quickened energies to a life in the service of mankind. This is exactly the sort of change I expect to see in the Appalachian region as the result of the changed principle in its control.

As the White Mountains form a most important part of the Appalachian region, a part in which New England people are especially interested and a part of wonderful potentialities of usefulness, I am glad to discuss briefly the question of making them more useful to the public under the ownership of the Government, to which they are now gradually passing.

In speaking of the White Mountain Forest I refer particularly to the 700,000 or more acres of land within the White Mountains proper, most of which should in time pass to the ownership of the United States, and also whatever additional acreage may be acquired in nearby mountainous localities. Only about 90,000 acres of this land is, as yet, being acquired, but whether acquisition goes on rapidly or slowly, I have no doubt that ten or fifteen years will see the bulk of these lands under Government control.

So far as known, this area has little or no minerals of value and it has little value for agriculture. Such small valleys as do have value for farming will be excluded so far as practicable from the purchases of the Government. Where it is impracticable to exclude them and where they are more valuable for the production of grass or grain crops than for timber growing, their continued cultivation under proper systems of farming will be permitted. Where they are not more valuable for these purposes than for timber, they will be allowed to revert to forest or be replanted.

The great value of the White Mountains so far as the capacity of the soil is concerned, is for the production of forest, and the forest which it can produce will serve two important purposes. First, it will regulate and make more even, the flow of the streams which have their sources in the mountains. It will also doubtless keep these streams purer than they otherwise would be and protect the river courses from filling with gravel or boulders, as certainly would be the case if floods were greatly increased. In any event there would come serious damage to the

water powers of these streams and also to their navigable utility.

REPRODUCING TIMBER.

The second purpose of this forest will be the production of valuable timber supplies for the industries of New England and the nation. The lands produce an excellent quality of some of the most valuable and widely used woods in the United States, and it will be of distinct advantage to the community if they can be restored to a high degree of productiveness of these timbers. The removal and utilization of the matured timber on these lands is not incompatible with the protection of the streams because methods can undoubtedly be devised whereby this merchantable timber can be cut and removed without impairing the protective influence of the forest.

The purpose, therefore, ought to be to bring these lands to a high degree of productiveness with the expectation that the timber will be used, in so far as its use is consistent with other important uses which are being, and increasingly to be, made of the mountains. Let us not forget that in its capacity for timber production, this forest is to be a very important asset to the nation.

RECREATION AND ENJOYMENT.

One other large and important use the White Mountain Forest is to serve in its employment for the recreation and enjoyment of the people. Conditions here are so delightful as to attract each year increasing thousands, not only from New England, but from all over the country. They find in these mountains just the surroundings in which to rest and renew themselves for their labors in their own cities and towns. Used in this way, the White Mountain Forest is an intangible, but nevertheless, a real asset, and possibly one of vastly under-appreciated importance in our national life.

Past experience leads us to believe that its use in this direction will increase rapidly in the future. Such being the case, none of the fundamental conditions which make for this use ought to be disturbed in order to allow for such a natural development as the future may require. We should look ahead at what may be required, and allow no present plans so to shape themselves as to thwart or diminish the possibility of this use.

We are absolutely certain that restoring the soil to its full volume of timber production will in no way conflict with any requirement in this direction; therefore, we may safely proceed first with the protection of the forest so that it may not be destroyed by fire and with such measures of regeneration and culture as will stock the land with a full crop of the best kind of timber. Whether, when timber of merchantable size has been produced, it will be deemed expedient to remove it for the use of the industries, or to let it stand for the enjoyment of those who visit the mountains, is a question more for the future to decide than for the present. It can, at the proper time, be decided for each of the many situations. My personal view is, that inasmuch as the timber can, by proper methods, be removed without vitiating the effect of the forest as watershed covering, so it can be removed without giving offense to the eye of him who desires to see the mountains clothed in a cover of perpetual beauty. Certainly to the eye of many, a forest under productive culture with its different parts in varying stages of production, maturity and use, is more pleasing than a forest fully produced but unharvested and deteriorating.

ROADS ARE NEEDED.

As a second measure of increasing the usefulness of the White Mountain Forest we may consider improvement of means of accessibility. Already many of the most attractive points are reached by foot-paths and the summit of the highest peak is accessible by driveway and railroad. These, while they have sufficed in the past, are not likely to be sufficient to meet the larger demands of the future. Many of the footpaths, especially those made by the Appalachian Mountain Club, are ade-

quate both in location and construction. Others have been laid out with less observance of the principles of correct trail building. In some places there are unnecessary paths which tend to confuse and mislead the travelers. Still other parts of the mountains which ought to be opened up to the public are not to be reached by paths that can be traveled in safety and comfort. What is needed, perhaps, is systematic plan of trails for the entire section, making use of those which serve present needs, adding others which may be needed, and abandoning those which serve no needful purpose.

It may not have been considered before that the paths which serve the public for travel in the mountains will not be sufficient for all purposes in the future. The protection of the region from fire will call for trails which can be traveled by horses used for carrying to vantage points supplies and equipment needed in combating fires. Some of the present trails can be so used, but many of them can not, and in some sections of the mountains where the fire risk is large, such trails are much needed. In as much as the making of the mountains safe from fire is the consideration of the greatest present importance, the Government will devote its first attention to this class of trails, and it is not likely for several years to have funds available for the construction of additional trails which are primarily for the use of the traveling public. The Government will therefore welcome the continued activities of those organizations which in the past have built the paths for the use of the public in the White Mountains. It will ask only that it be shown that there is a need for the proposed path and that it be properly located so that it may be of permanent value.

Of roads the Government will build only a limited mileage and their purpose will also be to make it easy to get supplies, equipment and men into the mountains to fight fire. They will be built only where trails would be inadequate for this purpose.

If additional railways or highways are built into the mountains it will be, so far as we can see now, by private capital for the purpose of profit. Before the construction of these should be permitted it should clearly be shown that they will serve the public advantageously and that their location and style of construction is such as in the smallest way to mar the natural beauty of the mountains. The Great Architect has been long in fashioning those mountains to their present form; we have but just begun to use them and we know not how many generations are to follow; therefore, we must use our best forethought that our plans for present use may disfigure them as little as possible.

HOMES FOR THE PEOPLE.

A third direction in which the White Mountain Forest may be made to serve the public more fully is by extending to the public the privileges of occupation and residence within it. When the public shall come to need it, what objection can there be to permitting the erection and use of camps and cottages within this forest. They would always be located in the more accessible parts and would generally be grouped along the streams where roads could be constructed without great cost. The amount of land required for such occupancy would be comparatively small, and, although it would be land of the highest timber-producing capacity, loss in this direction would be more than offset by having in the forest during the summer months a large number of people who would personally be interested in seeing that the woods suffered no damage from fire. There is small likelihood that the large use of the forest in this way would diminish appreciably its usefulness for stream protection or for timber production.

GAME PRESERVES.

A fourth way in which this forest may be increased in interest, if not in usefulness to the public, is to make it a refuge for such species of harmless game as are fitted by nature to thrive there. It adds much to the interest of

the woods to know that it shelters a variety of harmless wild creatures, of which, if we are wary, we may occasionally get a glimpse. And on the other hand there seems to be no objection to stocking these mountains with wild life if care is taken not to introduce species which would be harmful in destroying the stock or crops of nearby farmers.

It may not be possible to make the White Mountain Forest a game refuge without action by the State Legislature and also by Congress so that this suggestion looks rather to the future for fulfillment than to the present.

The general principle upon which the White Mountain National Forest is being established and to be developed has here been stated, and some of the lines along which this development is to take place have been sketched. The forest will undoubtedly be largely used by the public. It is desirable, therefore, that a spirit of friendly co-operation be fostered between the public and the Forest Service which will be responsible for the care and management of whatever lands the Government shall acquire within the White Mountains for national forest purposes. Speaking for the Forest Service, I desire to request such co-operation in large measure from the Society for the Protection of New Hampshire Forests, from the American Forestry Association, from the Appalachian Mountain Club and from all organizations which similarly have large interest in seeing that the White Mountains serve the public usefully and in the fullest possible way.

A FOREST PRODUCTS EXPOSITION

ARRANGEMENTS for a Forest Products Exposition to be held during the coming winter or next spring in Chicago and New York are now well under way. Following the endorsement of the plan by the National Lumber Manufacturers' Association, an organization has been effected, Mr. L. S. Case, of St. Paul, Minn., being chosen president, and J. E. Rhodes, of Chicago, the secretary-treasurer, and George S. Wood, of Chicago, manager.

The principal space of the exposition will be devoted to lumber, showing all methods of use. It is proposed that this space shall be divided equally between the affiliated associations which they may utilize for exhibits prepared by themselves or dispose of to individual exhibitors. That portion not used by any one association may be assigned to other exhibitors. There will be room for everybody. Invitations will be extended to the manufacturers of furniture, sash and doors, boxes, woodenware, and various other manufacturers of forest products, to participate actively in the exposition. The manufacturers of wood-working machinery are also invited to exhibit machinery, preferably in motion.

It is expected that the United States Forest Service will make a very interesting and attractive exhibit, showing much of its experimental work, fire protection, the extent of the nation's timber resources, and other features which will be of interest to the public. The American Forestry Association and other kindred organizations will be represented.

The Exposition Company will have charge of the decorative features, the publicity, and a number of general entertainment features, such as moving picture shows of logging operations, forest fire prevention, etc., for the purpose of showing the public something of the extent and importance of the lumber business.

A meeting hall will be provided in connection with both expositions, in which the retail lumber dealers will be invited to hold conventions, and where illustrated lectures will be given upon pertinent subjects.

The whole undertaking bids fair to advertise lumber, its availability, adaptability and multiplied uses, as

nothing ever undertaken by the industry has done. Similar exhibits held by the manufacturers of cement, brick and clay works, and other industries, have proven very successful as advertising features and have generally paid expenses,—some have paid substantial profits.

A few of the associations affiliated with the National Association have already made tentative arrangements for the preparation of exhibits as organizations and some very attractive and effective displays are being considered. Space which is not thus utilized will be sold to individual exhibitors. All exhibits will conform to the general plan outlined by the manager as to size and decorations, so that the entire exposition will present a harmonious and pleasing appearance. The possibilities of the Forest Products Exposition will appeal to all as the undertaking develops.

Now that the National Lumber Manufacturers' Association has gone on record in favor of the Forest Products Exposition, and the plans submitted by the committee have been approved by the Board of Governors, it is desired that all manufacturers interest themselves in the undertaking in order that it may be an unqualified success from every standpoint.

BLOWING OUT A FOREST FIRE

WHEN the members of the Eastern Foresters' Association held their meeting at Wanakena, in July, they were treated to an exhibition which they viewed with a great deal of interest. This was a demonstration of controlling forest fires with dynamite.

Broadly speaking, there are two kinds of forest fires—the over-head fire, where the flames leap from tree to tree, and the smouldering fire in what is called the forest duff, which is the deposit of dried leaves sometimes a foot or two deep. Of the two, the fire in the duff is perhaps the more menacing as it smoulders for a long time, running great distances, is difficult to detect at the distances of the Observation Stations, and is liable to break out in the open in several places at once.

The method adopted heretofore for controlling the fires in the forest duff has been to dig a trench by hand with a two-fold purpose of blocking the progress of the fire, and of exposing sand or loam, which can be thrown on the burning duff to extinguish the fire. At the Wanakena demonstration, Mr. S. R. Russell and Mr. E. R. Angst, of the du Pont Company, laid out a curved line of holes about 250 feet long, making them about 15 inches deep and about two feet apart, using a punch bar to make the holes. Into each hole was loaded one cartridge of 1 1-8 x 8 Red Cross straight 20 per cent strength dynamite, primed with a four foot No. 6 electric blasting cap. These were connected in over-lapping series so that the two free ends of the circuit were at one end of the line where they were connected to a duplex cable leading wire. The fire was started on the windward side in the forest duff and stimulated with a barrel of kerosene oil. A wall of fire twelve feet high bore down on the buried dynamite and when within a few feet of the line of holes the charge was exploded. The flame was extinguished by the blast from the explosion as you would blow out a candle flame. A ditch from four feet to five feet wide, two to two and one-half feet deep and 250 feet long was made which cut off and blocked the progress of the fire or any smouldering embers that remained, absolutely. The ground through which this ditch was made was of such character that it would have been almost impossible to dig it by hand, owing to the mass of thick underbush, fallen logs, etc. The "blasted ditch," beside extinguishing the flame of the fire and cutting off the path of the smouldering fire, also exposed the

earth below the duff so that the men could get into the ditch with shovels and throw the sand on the fire. The whole operation took only a few minutes and cost about $10.20. The members of the Association were very much impressed by this demonstration, as were also a number of representatives of private lumber companies, who announced their intention of supplying their watch stations with the necessary dynamite for combating forest fires by this method in the future.

3,779,041 TREES IMPORTED

FIGURES gathered by the federal quarantine board of the Department of Agriculture show that during the past fiscal year 3,779,041 growing trees and 15,040 pounds of tree seeds were imported into the United States. The trees include, say the members of the board, valuable species that do not grow in the United States and stock which can at present be bought more cheaply abroad. The tree seeds imported are largely for the purpose of reforesting land, though in a number of cases they are used in ornamental planting on individual estates.

France leads in the number of growing trees sent here, with a total of 1,782,255. Germany is second, with 849,245, and Holland third, with 690,632. Imports are made from 13 other countries, including India, Japan, and Australia.

The trees and shrubs imported are chiefly evergreens, such as pines, spruces, and firs, and broadleaf plants —oaks, maples, etc. The majority is stock of foreign origin, though in a few cases cultivators abroad through a special selection of attractive forms of our native trees have developed them to such an extent as to make them desirable to purchasers here.

Besides more than seven tons of tree seeds, many thousands of pounds of seed of perennial and annual plants, bulbs, and fruit stock, as well as ornamental shrubs, are imported. The greater part of the tree seeds, or more than 7,000 pounds, come from Germany.

INCREASED GRAZING IN CALIFORNIA FOREST

THERE has been a gradual increase in the demand for range within the national forests of California, as indicated by the reports covering the fiscal year 1913, which have just been received by the Forester in Washington. Statistics prepared by the U. S. Department of Agriculture, however, show a falling off in the number of live stock in the State of California amounting to 56,000 head of cattle and 53,000 head of sheep as compared to the same date of the preceding year.

The most striking change in grazing conditions on the national forests has been in the increased number of persons holding permits to graze stock within the forests. There are 153 new permittees, which increases the total for the State from 2,888 to 3,041. The total number of cattle and horses provided with range was 181,716 head, a raise of 1,852 head above the 179,764 head for which permits were issued the previous year. The number of sheep and goats also increased from 444,648 head to 449,105 head, a gain of 4,457. There was, however, a slump in swine, which dropped from 3,480 head to 2,360 head.

The average number of cattle and horses per permit in the State of California is 68 head, while the average number of sheep and goats is 1,191 head. These averages are a trifle less than the general average for all the national forests of the United States.

DEATH OF FRED GORDON PLUMMER

FRED GORDON PLUMMER, Geographer of the Forest Service, died suddenly on the night of August 15, at Washington. The news of his death came as a distinct shock to his fellow-workers and seemed beyond belief, for no member of the Service was more popular for his consistent qualities of loyalty, good humor and common sense.

Briefly, his career may be summed up as follows: Mr. Plummer was born in New York City on October 4, 1864. His first public work was in 1883, when he was employed by the War Department as rod-man and level man on special work in connection with levee construction on the lower Mississippi River, where he also served as sub-inspector. In 1884 he worked on a city survey at Tacoma, Wash., and left this to complete his engineering education in New York, Brooklyn and Boston, after which he went back to the State of Washington as assistant curator of the Agassiz Museum at Olympia.

For two years after this he was instructor in chemistry, physics and astronomy at Washington College, Tacoma, and then took up practical engineering and surveying. He occupied successively the position of chief engineer for the State University Land and Building Commission, the Tacoma Waterworks Commission, and Puget Sound University, and was special engineer for Pierce County.

He was later employed by the Northern Pacific Railway, compiling timber statistics and mapping and preparing irrigation plans.

From 1898 to 1903 he was special field assistant of the Geological Survey detailed to the examination of the National Forests, and in 1903 he passed the civil-service examination for irrigation engineer and hydrographer, and in the same year was appointed engineer in the Geological Survey. In July, 1905, he was transferred as civil engineer to the Forest Service.

Mr. Plummer was a voluminous writer on subjects connected with geology, geography, and forestry, and wrote the first descriptions of forest conditions in many of the National Forests of Washington, Oregon, Arizona, New Mexico, and California. His chief work for the Forest Service was done as its geographer, and his compilation of statistical and map data is one of the most notable in this country, if not in the world. He was a member of several technical societies, including the Washington Academy of Sciences, the Society of American Foresters, the Geological Society, and the U. S. Board of Geographic Names.

A less formal estimate of Fred Plummer's career as scientist, companion, child-lover, and friend was given in the simple memorial exercises which were held in his praise and honor by the Forest Service. These services were conducted as his fellow-workers thought Plummer himself would have liked to have them, and were therefore in a more familiar and less stereotyped strain than such exercises usually are.

They were led by Dr. Le Grand Powers, chief statistician of the Census in charge of agriculture, a personal friend of Mr. Plummer's and an ordained minister. Because of Mr. Plummer's interest in theosophical thought, Dr. Powers' opening reading contained a beautiful selection from the Hindu scriptures.

Henry S. Graves, Forester, spoke of Mr. Plummer's career as a member of the Forest Service, and said, in part:

"We are all glad of the opportunity to pay tribute to our friend and co-worker, Fred Plummer, and to talk of his splendid life and work. A man of strong individuality and lovable traits of character, he made a unique place for himself among friends, just as he did in his profession. Since he has held the position of Geographer in the Forest Service he has brought together all the available information concerning the National Forests. He created what is

known as our forest atlas, and through untiring efforts has developed this to a point which is already resulting in making our field work count for permanent and organized effort. Plummer had an unusual genius for this work. His foresight, his large outlook, and his enthusiasm have had results of the greatest value. It was an inspiration to work with Plummer, and he will always be counted as one of the real builders of forestry in this country."

Mr. Bristow Adams, Forest Examiner in the Forest Service, gave a brief account of Mr. Plummer's connection with the Forest Service Christmas celebration, and said:

"You will recall that that Christmas celebration was started by our beloved 'Uncle Harry' Towers, who instituted the custom of gift giving to the children of the members of the Service. When Uncle Harry passed away it was thought by many in the Forest Service, and by Fred Plummer in particular, that this celebration should be continued in the form of an annual memorial to keep green the memory of Mr. Towers. Few of us can realize what a vast amount of work is necessary to get on the boards the little celebrations which gave gladness not only to the children but to grown-ups. Last year the little pageant was altogether Mr. Plummer's work. The dialogue of that fifteen-minute playlet is classic. It exemplified three particular things of Fred Plummer's character—his love for children, his sublime belief in what faith will accomplish, and his great aptitude for seeing the bright, whimsical, humorous side of things."

One of Mr. Plummer's other interests, which reflected a lighter side of his character, was touched on by Mr. A. F. Potter, Associate Forester, as follows:

"Mr. Plummer was a man of very attractive personality and exceptionally entertaining. Among his many accomplishments was that of being an expert magician. He took great pains in doing sleight-of-hand tricks and afforded his friends much pleasure and many surprises. In my memory of Mr. Plummer not only will his great scientific accomplishments stand out, but also his ability to lighten the daily task with his expertness as a magician. The greatest tribute I can pay him is to say that we are all proud and glad to have known him."

Mr. Plummer's attainments as a geographer were touched on by Dr. Henry Gannett, President of the Geographic Society and Chairman of the U. S. Geographic Board, in part, as follows:

"My acquaintance with Mr. Plummer began some 15 years ago, when he was connected with the Northern Pacific Railway land department. Some seven or eight years ago, he was made a member of the Geographic Board, and immediately became of great value on account of his wide acquaintance with place names in the West. His early education and engineering training was supplemented by wide reading and deep study so that he became an able geographer, surveyor, engineer, statistician, botanist, and forester. He was one of the few men who are creative, original, who bring forth new ideas, new methods."

Perhaps the best idea of Mr. Plummer as he was known and loved by his friends was given by the brief personal reminiscences related by Mr. D. D. Bronson, Chief Inspector of the Forest Service, who said:

"It has been my good fortune for the past few years to have been thrown very intimately with Mr. Plummer as a coworker in the Forest Service. It can most truthfully be stated that 'Naught but good can be said of this man.' He was a scientist, a philosopher, a worker, a helper, and a *man*. I remember an incident related to me by Mr. Plummer as I was dining with him on Friday evening of last week, which illustrates his unfailing willingness to help out. Several years ago he was in charge of a field party of engineers, and they were encamped near a cross-roads country church. While they were in the midst of checking up their field notes a man appeared at the entrance of the tent and asked if any of the party could play the organ. He stated that the local organist had been taken ill and that they were in dire need of a substitute. Mr.

Plummer immediately dropped his work and volunteered and, in his rough field clothes, went to the church and helped out by acting as organist. When Mr. Plummer told me this incident he said, with a reminiscent smile, 'My hands were so hard and stiff from my field work that I was unable to speed up the organ much, but luckily the country choir drawled the hymns very badly, and we kept together fairly well.'

"We have been Plummer's co-workers in the Forest Service and in other scientific lines, while we will remember him as a scientist, as a philosopher, as a worker, as a helper, and as a splendid man and thorough gentleman, will also remember him as our friend, and the memory of Fred Plummer will encourage us in our endeavors and aid us in our efforts. While our loss is great, we may be sure that, in the words of the song, 'His soul goes marching on.' "

INDIANA'S FORESTRY EXHIBIT

INDIANA is to have an exhibit of forestry at the State fair at Indianapolis in September. The Board of Forestry will have charge of it and will be assisted by P. H. Teal, a graduate of forestry at Purdue University. The display is intended to serve the following purposes:

(1) To make it interesting from the point of view of the casual sightseer.

(2) To impart some instruction to those wishing to learn.

(3) To create a sentiment in favor of wood preservation, by the use of treated timbers, and by substituting less expensive but more prevalent for more expensive and less prevalent species.

(4) To call the attention of young and old to the beauty and charm of the trees themselves, whether used as ornaments to the home grounds, as shade trees along streets or avenues, as necessary adjuncts to beautiful parks, or as producers of lumber.

(5) To stimulate a desire among the people of this commonwealth to plant, care for and protect trees.

(6) To cause their value as a product of nature to become more apparent to the layman.

(7) To bring the Board of Forestry before the people—to prove to them that there is a Board, and to explain the reason for its existence.

In order to be as nearly complete as possible and to cover the required ground as thoroughly as could be expected under the difficulties encountered, the exhibit will not only illustrate extensively Indiana forest products, both in the crude and finished state, but will endeavor to bring out by means of photos, suitably enlarged, present existing conditions, forest plantings in Indiana, pruning, and the care of trees. Some attention will be paid to shade trees, their planting and protection. A number of photos illustrating the processes used in tree surgery will be displayed. The preservation of wood, by means of commercial preservatives, such as creosote, and by the use of veneers and wood substitutes, will have a place in the exhibit. To those interested, the relation which our feathered associates, the birds, bear to forests and their protection, will be made clear by graphical representation of their foods.

An important phase will be to bring out the educational side of the exhibit, particularly through the distribution of the 1910 and 1911 reports of the Board and reprints from the last report; by means of slips bearing a list of interesting books on forestry, pamphlets on Indiana Forest Laws and Forest Fire Laws; and through the medium of forest maps, including a detailed outline of the State Forest Reservation.

Something like 200 letters have been mailed to the lumber and veneer men of the State and to the U. S. Forest Service, soliciting their co-operation and aid in this undertaking. They have for the most part replied favorably signifying their willingness to assist us. In addition, the Forestry Department at Purdue has consented to

contribute largely toward the betterment of the exhibit. The interest taken in this work from outside sources and the help obtained through contribution are important factors upon which the Board bases its hopes of making the exhibit fill the purpose for which it is intended.

THE VAMPIRE WOODSMAN

By HANS WACHSMUTH

(With apologies to Kipling)

A fool there was, and he thought it it divine—
(Even as you and I)—
To wantonly waste his Virgin Pine—
(As a matter of fact, he committed a crime),
But the fool, he thought he was doing fine—
(Even as you and I).

Oh, the woods we waste and the goods we waste—
And the work of our head and hand,
Brings us no profit, glory or fame,
And contemptuous reproach will cling to our name
In the future throughout the land.

A fool there was who, with never a thought—
(Even as you and I)—
Wilfully wasted what can not be bought,
And, vainly pursuing the fortune he sought,
Devastation and dire destruction wrought,
(Even as you and I).

Oh, the toil we lost and the spoil we lost—
And not even worldly gain
Rewarded the efforts of feverish haste
With which we have laid our forests waste,
And plodded and planned in vain.

The fool stripped himself when he stripped his land,
(Even as you and I),
Which he might have foreseen, could he but understand
That God, Himself, our forests planned,
Which none can rebuild with a magic wand,
(Not even you and I).

But it isn't the shame and it isn't the blame,
That grips with the force of a vise—
It's the coming to know that we could not have failed
In fame and fortune, had we only curtailed
Our output and asked the price.

COMING MEETINGS

September 9-11—Concatenated Order of Hoo-Hoo, St. Louis, Mo. Annual meeting.

September 18—North Carolina Pine Association, Norfolk, Va. Monthly meeting.

September 24-27—Pacific Logging Congress, Spokane, Wash.

September 29, 30—Southern Logging Association, Grunewald Hotel, New Orleans, La.

November 18-20—Fifth National Conservation Congress, Washington, D. C.

FEDERAL FOREST POLICY RESPECTED.

In an increase in timber sales this year and in a decrease in receipts from timber trespass as compared with last year, national forest officers see a growing use of the forests and respect for the federal forest policy.

FOREST BUSINESS BEATS THE RECORD

THE national forest business done during the fiscal year which ended June 30 surpassed all previous records. The receipts from the forests approached $2,500,000, of which about one-half was for timber, while contracts entered into for the sale of timber to be cut either at once or in later years totaled about $4,000,000. These sale contracts permit the cutting period to extend over a number of years when large bodies of timber are involved.

Under existing laws 35 per cent of the gross receipts, or between $800,000 and $900,000, will go to the benefit of the States in which the forests are situated, for schools and roads.

The records show that the volume of sales contracted for in different years fluctuates widely, with ups and downs according to general business conditions, while the actual cut has shown a fairly steady tendency to advance. In the fiscal year 1906 (July 1, 1905, to June 30, 1906), the first full year after the Forest Service was put in charge of the forests, the timber receipts were about $250,000, in the fiscal year 1907 something less than $700,000, and in 1908 about $850,000. In 1909 timber receipts dropped back to less than $750,000, but in 1910 and again in 1911 were over $1,000,000, and in 1912 were nearly $1,100,000, as against about $1,250,000 for the year just closed.

Forestry officials say that the principal factor in determining how much timber will be sold in any given year is the general lumber market, which in turn depends largely on general business conditions. Thus, when indications are that a period of brisk demand is ahead, with increased building activity, railroad construction, mining development, and other forms of business expansion that call for lumber or timber, operators are seeking contracts. When business halts lumbermen naturally go slowly in the matter of committing themselves by new purchases on a large scale. But cutting under earlier purchases and small sales continues even in periods of depression. The gradual diminution of outside sources of supply and the steady development of the country, which create increased local demands, tend to offset the effects of such periods.

As an illustration of this the figures for 1907 and the immediately following years are cited. In the fiscal year 1907 the Forest Service sold more timber than has been sold in any later year prior to that just closed. Contracts were made covering over a billion feet, board measure. But in the fall of 1907 came business panic, followed by inactivity. Sales in 1908 disposed of less than 400 million feet, and in 1909 of less than 300 million: In both these years more timber was cut under sales than was disposed of through new sales. The difference was the result of cutting under the contracts of earlier years.

Last year's sales of over $4,000,000 worth of timber does not necessarily mean a prospective income from timber of this large amount in the immediate future. To bring this about there would have to be a series of big sale years. The present year may or may not see sales equal to those of the last. While general market conditions are at present less favorable to large commitments than they were six months ago, the aggressive sales policy now in force, with its opportunities for long-term purchases on fair terms where sales are possible in no other way, will probably counterbalance to a greater or less degree influences that may tend to check sales. The need of the country for national forest timber is growing and every year brings normally more of this timber within the radius of effective demand. The yearly cut and the income from the forests can reasonably be expected to rise in the future as it has been rising, however, the number of sales contracts may fluctuate.

STATES GET A THIRD OF FOREST SERVICE RECEIPTS

A CIRCULAR issued by the Forest Service calls attention to the various laws under which more than a third of all national forest receipts go to the benefit of the States in which the forests are situated, for schools and roads. In 1912 the amount of money thus made available for State purposes totaled about $750,000. The report does not show the amounts due from the receipts of the fiscal year which closed June 30, 1913. Including these, the States' share of national forest funds since the laws were passed has aggregated over $3,000,000.

These facts are set forth, according to the Forest Service, because a popular impression still exists that all money received by the Government from timber sales, grazing fees, waterpower permits, etc., is permanently taken out of the States where it is paid and goes into the national treasury to meet the general expenses of the Government. This idea is said to prevail, to some extent, even among actual forest users in the national forest States, where the division of receipts with the States has been going on for years.

The circular states that part of the gross receipts of the national forests was first made available for schools and roads when the agricultural appropriation act of June 30, 1906, directed the Secretary of the Treasury to pay over to the State or Territory in which any forest reserve was situated ten per cent of all money received during the fiscal year from such reserve. The money was to be expended by the State or Territorial Legislature for the benefit of public schools and roads in the counties in which the forest reserve lay. This legislation was recommended by the Forest Service because of the recognized burden imposed locally where national forests operate to prevent much land from becoming taxable.

In 1908 the amount to be paid to the States was increased to 25 per cent, and a proviso of the earlier act that no more should be paid to a county than 40 per cent of its total income from other sources was eliminated. Since this proviso was removed, some of the counties' receipts from national forest lands have equalled their income from all other sources.

In August, 1912, the agricultural appropriation act for the year made available an additional 10 per cent of the money received from national forests to build and maintain roads and trails within national forests for the benefit of the public, in the States from which these proceeds are derived. This 10 per cent "road item," as it is called, is expended by the Secretary of Agriculture, who may, according to the act, "whenever practicable in the construction and maintenance of such roads, secure the co-operation or aid of the proper State or Territorial authorities in the furtherance of any system of highways of which such roads may be made a part." The total amount expended under this provision from the receipts of the fiscal year 1912 is $207,295. This was apportioned among the States as follows: Alaska, $4,675; Arizona, $24,645; Arkansas, $2,283; California, $24,821; Colorado, $21,503; Florida, $981; Idaho, $23,809; Kansas, $489; Michigan, $2; Minnesota, $503; Montana, $23,926; Nebraska, $1,630; Nevada, $6,034; New Mexico, $11,850; North Dakota, $28; Oklahoma, $351; Oregon, $17,023; South Dakota, $4,226; Utah, $13,504; Washington, $12,758; Wyoming, $12,254.

The Weeks law of March 1, 1911, providing for the acquisition of lands in the Appalachians, provides that five per cent of moneys received from each national forest into which the lands acquired are divided, be turned over to the State for its public schools and roads. New Mexico and Arizona, be-

sides the sums before mentioned, are entitled to approximately 11 per cent of the gross proceeds of all national forests in those States in return for the State school sections within national forests. This provision is embodied in the act of June 20, 1910, authorizing the admission of the two new States.

SHEEP GO FOUR MONTHS WITHOUT WATER

WASHINGTON, June 28.—Sheep on the Nebo National Forest, Utah, go four and a half months without water except for such moisture as they get from the dew and the juices of forage plants.

Grazing sheep on a range entirely destitute of water is a recent innovation due to the increasing demand for forage and the efforts of the forest officers to find a place on the forest ranges for all the stock that can safely be admitted. The area on the Nebo which has now proved usable by sheep is high and rocky, a portion of it being above timber line, and it has neither springs nor streams of sufficient size or accessibility to be used for stock watering purposes. The grazing season lasts from June 15 to October 31, and during this period of four and a half months the animals do not get a drink.

Under such conditions, however, the sheep have done extremely well, and last year's lambs from this range had an average weight at the close of the season of 68 pounds on the Chicago market, which was rather above the normal weight from that vicinity.

In one area on the Targhee Forest in Idaho, sheep get water only twice during the four-months summer grazing season. There is no water on the range, but the sheep are driven to a nearby stream lower down the mountain side. Lambs from this range weighed 65 pounds on the Chicago market.

QUEBEC FOREST SERVICE.

The forest service of the Province of Quebec will shortly begin work on the compilation of aninventory of the forest resources of the Province. In the territories under license to cut this inventory is left to the initiative of the licensees. Already some have started this work, including the Laurentide Paper Company, the Riordon Paper Company, and the River Oualle Pulp Company, which have had part of their limits cruised and mapped by experts, and which also employ foresters. The inventory of the resources of the vacant lands will enable the Government to dispose of the non-agricultural sections for the use of the people.

MOTION PICTURES OF FOREST SERVICE WORK

Motion picture companies are making films of all of the activities of the federal forest service, including planting, cutting timber, patrol, and lookout work. Already at least two fire-fighting "movies" are being exhibited.

FRANCE PLANTS TREES

France has spent $35,000,000 in planting trees on the watersheds of important streams.

PRACTICAL LUMBERING EXPERIENCE.

The leading forest schools of the country not only have their own forest tracts for continuous experiments, but give their students actual experience in the woods by having them take part in big lumbering operations.

GOVERNMENT BUFFALO HERD IS INCREASED

THE birth of ten calves in the buffalo herd maintained by the Government on the Wichita national forest and game refuge, near Lawton, Oklahoma, has been reported by the game warden in charge. The herd now contains a total of 48 head of full-blooded buffalo, or, more properly, bison, of which 27 are males and 21 females. All of the animals are in splendid condition.

In 1907 the American Bison Society donated to the Federal Government a nucleus herd of 15 animals which had been bred and reared in the New York Zoological Park. The animals were transported to the Wichita national forest, which is also a game refuge, and placed under the care of the Forest Service. They readily adapted themselves to their new habitat, but the area upon which they were placed was within the zone affected by the Texas fever tick and during the two or three years following their transfer only the constant care and watchfulness of the forest officers prevented the complete loss of the herd.

The animals were examined almost daily to determine whether they had become infested with Texas fever ticks and were placed in specially designed cages and sprayed with crude oil at intervals of from 15 to 30 days, but notwithstanding the extreme precautions which were adopted three of the animals died. Gradually, however, the enclosures in which the buffalo were confined were freed from fever ticks and there is a possibility that as the buffalo adapted themselves to their new environment they became more or less immune to the disease. No losses from Texas fever have occurred for several years, and the herd has almost quadrupled in number since it was established.

The fact that the herd has not increased more rapidly is due largely to the preponderance of male calves. This characteristic of the buffalo is so pronounced in all of the herds now in captivity that a cow is considered twice as valuable as a bull.

STATE NEWS

Connecticut

The annual meeting of the Connecticut Forestry Association was held at the Rainbow Forest Plantations of the Connecticut Agricultural Experiment Station in the town of Windsor. As the annual meeting for 1908 was held at the same place many who attended both meetings were able to see the results of five years' growth on the plantations, and the inspection of these was an interesting part of the program. At the business meeting the following officers were elected: President, F. H. Stadtmueller, Elmwood; vice presidents, J. W. Alsop, Avon; Prof. J. W. Toumey, New Haven; E. D. Curtis, Bantam; recording secretary, Eugene Walker, Union; corresponding secretary, Miss Mary Winslow, Weatogue; treasurer, Alfred Spencer, Jr., Hartford; auditor, A. R. Hillyer, Hartford; advisory board, the foregoing officers and Prof. K. C. Hawley, New Haven; E. C. Douglas, Middletown; W. M. Shepardson, Middlebury; publishing committee, W. O. Filley, New Haven; Miss Mary Winslow, Weatogue; Dr. E. H. Jenkins, New Haven. In the afternoon, a paper, "The Future of Forestry in Connecticut," was presented by Prof. J. W. Toumey, director Yale Forest School; also one on "Progress of Forestry in Connecticut," by W. O. Filley, State Forester. The discussion which followed resulted in a vote by the Association that the advisory board be authorized to plan and carry out a study of the forests of Connecticut. This study will be published so that it can be used in an educational campaign throughout the State, which will prepare the way for the asking of larger appropriations for forestry purposes at the next session of the general assembly. The advisory board was further instructed to prepare an educational circular on forest fires to be distributed to the school children of the State. In accordance with this action the

advisory board is already planning for the publication of a forest fire circular this fall, and a study of forest conditions to be made during the coming year.

The report of the State Forester for 1912, recently published by the Connecticut Agricultural Experiment Station, contains several papers of interest to friends of forestry. In addition to the report of work accomplished by the department, the former State Forester, Samuel N. Spring, now Professor of Forestry at Cornell University, contributes a paper on "Forest Planting in Connecticut." This summarizes the work done along this line in the State during the past decade and gives advice regarding species, methods of planting, etc. A guide to the Rainbow Forest Plantations of the Connecticut Agricultural Experiment Station, prepared by W. O. Filley, State Forester, is included in the report. These plantations were begun in 1901 and the results so far obtained are of great value to all interested in forest planting. There is a map showing the location of the plantations as well as several interesting illustrations. Copies of the report or reprints of the separate papers may be obtained from the Connecticut Agricultural Experiment Station, New Haven, Conn.

The forest taxation law, passed by the recent session of the general assembly, offers considerable encouragement to investments in forestry by providing a just system of taxation for timber land in the State. Copies of the law may be obtained from the State Forester, New Haven, Conn. (See article in this issue.)

Another law of considerable interest, passed by the recent session of the general assembly, is that instructing the Governor to appoint a State Park Commission, consisting of six members in addition to the State Forester ex-officio. This commission is authorized to acquire and maintain State parks, which shall be primarily for purposes of public recreation or for the preservation of natural beauty and historic associations. The fact that the State Forester is an ex-officio member of the commission indicates, however, that there will be no conflict between the State park policy and the older State Forest policy. In fact, it is quite probable that one will supplement the other, forestry being practiced in the State parks so far as possible and the State forests being used for recreation purposes when not incompatible with their use for the growth of timber. Governor Baldwin has appointed the following as members of the commission: Gen. E. E. Bradley, New Haven; J. E. Calhoun, Cornwall; Prof. H. H. Chapman, New Haven; J. O. Fox, Putnam; Mr. Lucius Robinson, Hartford; E. H. Wilkins, Middletown. It would be difficult to select a more representative or more public-spirited set of men. Although but a small appropriation is provided to begin with, they will undoubtedly be successful in securing for the public a few desirable camping and recreation grounds in the State.

California

The experience of Marin County during the time when a fire on Mount Tamalpais threatened Mill Valley and several other towns in the vicinity has led State Forester Homans to begin a systematic investigation of forest areas in California frequented by summer vacationists, with the idea of suggesting that they be organized into fire districts.

The field work in connection with the investigation is being carried on by J. B. Schoeller, one of Homan's assistants, who is now in the Santa Cruz Mountains. The investigation will cover the Lake Tahoe region and also the Russian River section.

Oregon

The fire situation the middle of August continues most favorable. There has been no loss of green timber in the State, and only small losses of logging equipment through slashing fires. The country is smoky from the burning for land clearing purposes, and the few slashing fires which, though well under control, are not entirely out.

Reports received by the Oregon Forest Fire Association from the different counties of the State show a dry condition in the timber, but wardens are using every precaution to see that care is exercised in the use of fire.

At a recent meeting of the State Board of Forestry a resolution was passed cautioning wardens to be unusually careful from now on in the matter of issuing burning permits.

Another resolution to the effect that no patrol would be recognized as efficient by the Board, unless the wardens were given appointment as State Wardens and consequently authority to enforce the law, was passed.

There are now 19 co-operative patrol districts in the State which cover by far the bulk of the heavily timbered area. These county patrol associations are all doing good work and furnishing protection to their members at low cost.

Some 300 paid wardens, State and private, are now looking after the area outside the National Forests. All agencies are cooperating thoroughly and successfully. The lack of fires this season of the year is due entirely to good organization, and a good force of patrolmen.

Fires have occurred in Columbia, Washington, Coos, Wheeler, Multnomah and Benton counties, and some equipment has been lost. Up to date, however, no fires have gotten beyond control and no timber has been destroyed.

Local showers have occurred within the past week, but no general or heavy rains.

With the shortening of the days and the close approaching of the wet season, the chances of loss of timber in Oregon are getting more remote very rapidly.

The Fire Patrol Law, passed by the last Legislature, is proving to be a very desirable addition to the forest code of the State. More than seventy-five per cent of the timber owners of the State are affiliated with local forest fire associations. These associations provide a patrol for the lands of their members which, as the law directs, must meet with the approval of the State Board of Forestry. It is unlikely that the cost of the patrol furnished by these associations will, in any case, exceed the maximum of five cents per acre which the law permits the State Board of Forestry to collect from timber owners for fire patrol purposes.

In these yellow pine districts of Eastern Oregon, in which the timbermen have not associated for the purposes of fire protection, the State Forester is supplying an adequate patrol at a charge of approximately one cent per acre. The fire hazard in this region is, of course, much less than in the Douglas fir belts of the western part of the State.

Climatic conditions have favored the timbermen thus far this season. Late spring rains and occasional showers have greatly reduced the fire risk. Reports to the State Forester show that a few small fires have occurred, but these have been extinguished with practically no loss of green timber.

Michigan

A visit covering a period of three days at the Higgins and Houghton Lake State Forests was recently made by members of the Public Domain Commission. This was in reality a tour of inspection, including the Higgins Lake State Forest nursery, the plantations, fire lines, buildings, improvements, and general conditions on these two forests. Everything was found to be in good condition and the Commission were very much encouraged with the outlook for the future.

On August 7th the regular monthly meeting of the Public Domain Commission was held at the headquarters of the Fife Lake State Forest, where operations along protective lines have been in progress for the past two months. The necessary buildings have all been completed and a number of miles of fire lines have been built. After the meeting a drive over the reserve gave the members a good opportunity to observe the natural features of this forest, as well as the character and extent of the work that has been done here.

Another of the State forests that has been added to the list of those already under management is the Lake Superior Forest, in Luce County, in the Upper Peninsula. It embraces an area of approximately 135 square miles, and has a coast line of about twenty-one miles along the south shore of Lake Superior. This is one of the largest of the State Forests and is, in many respects, one of the most promising, as thousands of acres are covered with a good natural regeneration of white, Norway and Jack pine, to reproduce which by artificial methods would cost from $5.00 to $10.00 per acre. Rangers' headquarters have been established in a central location. The old railroad grades, over which the logs were moved when the original stand of timber was cut some twenty-five years ago, are being made into fire lines.

The Higgins Lake State Forest nursery, which now covers five and one-half acres, is being increased to twice its present size. This addition has become necessary in order to meet the increasing demand for seedlings and transplants for both general distribution and purposes of reforestation on the State Forests.

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